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FORMERLY SPORTS CARS ILLUSTRATED

July 1961
Vol. 7 No. 1

road research report

Lancia Flavia 44

road tests

Austin-Healey Sprite II 24
Fiat Abarth 1000 26

men and cars

The Enzo Ferrari of Okie Flats ..... Henry Manney 21
Upcoming Lowlander ..... Dennis May 38

features

Immortal Le Mans Machines ..... Robert Straub 28
Hardly Hidebound ..... Peter Sukalac 40
Ford International: Blueprint for the Future? Anthony Vice 50
The Car That Made Good in a Day ..... John Bentley 62

technical

Ferrari F.1/60 52
Ferrari F.1/61-120° ..... Karl Ludvigsen 54
Ferrari 246-Sport 60

competition

Sports-Racing Curtain Call at Le Mans . Jesse Alexander 32
Jaguar XKE Wins First Race! ..... David Phipps 36
C/D's Concours 66

departments

Observation and Opinion 4
Letters 6
European Newsletter 10
Technotes 14
Detroit Newsletter 16
Pipeline 18

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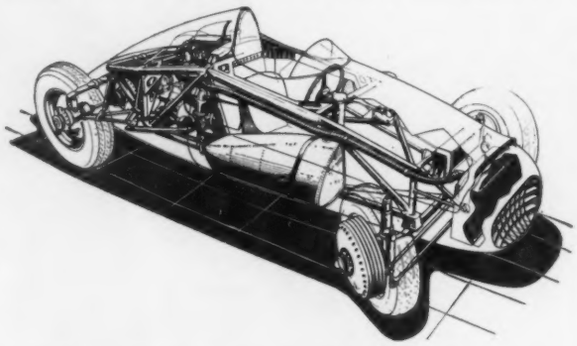
OBSERVATION AND OPINION

ITALIAN REVOLUTION – It's hard for us to appreciate the violent nature of the changes being wrought in the Italian car. This issue describes radical (for them) moves in two directions: a rear-engined racing car, by Ferrari, and a front-drive production sedan, by Lancia. These drive systems in these respective fields are almost, but not quite, unprecedented.

Front-drive sedans have reached the prototype stage in Italy, like Fessia's Cemsa-Caproni, but the Flavia is the first to achieve important production. Rear-engined racers have been just as ephemeral. Before the war, Ferrari's stable had built the famous *Bimotore* Alfa Romeo, a conventional Alfa G.P. car with an additional engine hung out behind the rear axle. It was a purebred precursor of Lloyd Scott's twin-engined "Bustlebomb" dragster. Then Alfa built a car that sounds apocryphal but may actually have existed: the Type 512, a rear-engined flat-12 G.P. machine with 1½ supercharged liters, said to be designed by Wilfredo Ricart, the later creator of the Pegaso sports car. It was never raced, supposedly because the Type 159 "Alfetta" was sufficiently fast, and was never seen in public.

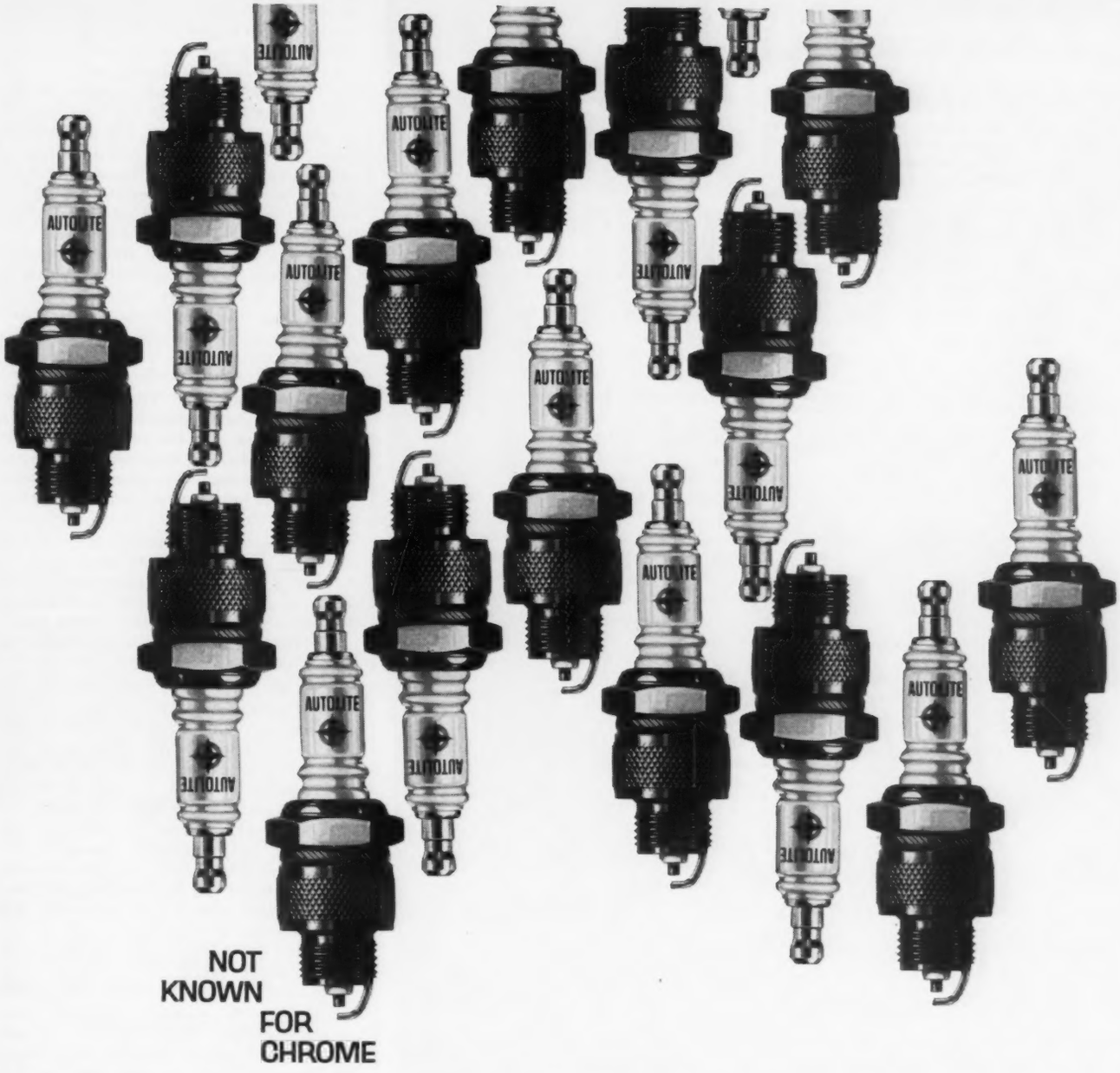


After the war came the Cisitalia-Porsche Type 360, which resembled the Type 512 Alfa in general layout as we showed in last April's C/D. Though this car was built in Italy, it must still be regarded as a German design. Just the reverse was true of the Bugatti Type 251, which was built in French Alsace-Lorraine but designed by Italian Colombo. This G.P. car had its eight-cylinder engine placed crossways in front of the rear wheels.

Alejandro de Tomaso was one of the first men working in Italy to note and follow the Cooper trend, with a Formula 2 car and then his line of Isis Juniors. Wainer, De Sanctis and Moretti-Branca also produced rear-engined Juniors as early as 1959. Our favorite among rear-engined Italian racers, though, is the space-framed machine Enrico Nardi made (but never raced) for the old two-liter Formula 2. Shown here, it used a Lancia Aurelia V6 hooked directly to a transaxle of like origin. It used Aurelia suspension front and rear, had twin side fuel tanks, and boasted way-outboard front brake drums that would have done a fine cooling job. In frame layout and general looks it strongly resembles last year's Formula Junior Dolphin.

DOLPHIN DEVELOPMENTS – Bud Hull and John Crosthwaite of Dolphin didn't sit idle during the winter. On the contrary, they set out to produce a new Junior that would be lower than the car we described last December, and lower than the 1960 Lotus too. They succeeded so well that the new Dolphin International is an inch lower than *this* year's Lotus XX Junior, and a beautiful racing car in every respect. It goes well too. Look for the new Dolphin on the cover of next month's CAR AND DRIVER, which will also contain a C. O. LaTourette cutaway of the car and a full report on it by Wayne Thoms. There'll by other Juniors in cutaway form next month: from England the rear-engined Lola, and from Italy a new Dagrada with its engine in the back, using the Lancia Flavia gearbox assembly.

Also on the stocks for August is the first installment in a three-part history of Chrysler's 300, researched in depth by Bill Carroll. This first segment deals with the early days of Chrysler-Cunningham cooperation and discusses in detail the booming Chrysler V8s that were prepared to race at Indy. Speaking of racing, August will bring the first round of reports on the new European season, which promises to be a ring-ding. Look for the Dolphin cover! —*Karl Ludvigsen*



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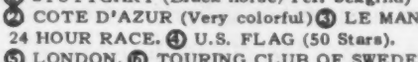

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HOW TO PLAY "THE GAME"

As the new owner of a sports car, I am interested in the proper etiquette for sports car drivers. I realize there is a very definite code of conduct. Has it been written anywhere?

May I, in my MGA, overtake and pass a Sprite? Would I be presumptous in passing a day-dreaming Jag? Should I wave to hard tops? If I wave to mother who is driving a domestic sedan will I be piped out of my sports car club? (They have assured me I will.) What about the joker in the Merc who wants to race?

These and other questions remain unanswered. When I brought this up at a recent meeting of the Heel & Toe Sports Car Club in Monmouth County, New Jersey, they promptly put me on a committee to find the answers for myself. Help! Please!

Florence Davis
Long Branch, New Jersey

There is a definite code of conduct, although its implementation is in disrepute among some of the "new wave" of sports car owners. The old pros, you may have observed, follow it explicitly and many of the enlightened newcomers (like yourself, no doubt) make attempts in that direction. However, the Code, much like Common Law, is unwritten. It springs from folkways as old as the automobile itself. Some romanticists, like those who drive Singer SM 1500s, maintain it springs from the heart.

You will realize our attempt to answer your questions sheds only one small ray of light on the murky subject of sports car ethics.

To begin with, you may pass a Sprite in your MGA, but never in first gear when leaving a stop light or in fourth when climbing a hill. In a curve, use your discretion. It is generally considered good form to beep your horn twice, lightly and briefly, before pulling past — much as you would do in passing a TC. It's a sort of "Hope you don't mind, but my plugs foul at under four thou" greeting. None of the foregoing applies to Sebring Sprites which, of course, must fend for themselves. Healey drivers should use similar tact in passing MGAs. In any case, don't beep at night; turn off your lights or take a short cut.

Any and all day-dreaming Jags should be passed. No day-dreamer should be allowed to drive one unless it's a Mark IX and he's dreaming of making a killing on the stock market. Use caution though, Jags are deceptive and at 80 they can cause a look of extreme self-satisfaction on the part of the driver, a look that can easily be mistaken for day-dreaming.

There is no set rule for waving to hard tops. On sunny days, provided the car has an out-of-state license, a single horizontal wave (from left to right with the right hand) is acceptable. If the car is a local one the driver is obviously too lazy or too uninterested to leave the lid in the garage; a mildly condescending sneer is in order (and the car probably has white walls and wire wheels anyway). In the rain there are also two maneuvers. If your top is down, no recognition of the hard top is required, but if you have put your top up, a look of admiration (not fawning, mind you) is the general ploy. Occupants of the hardtop in such circumstances should return the greeting with a nod — smirking is optional.

By all means wave to Mother. Mothers are protected by the Constitution regardless of their propensity for cars that start all winter long, keep the occupants warm and dry, have seats for a family and trunk space to spare. Mothers may be terrible drivers, but recognition of them is statutory — there's no way out. To minimize your chances of being drummed out of the corps, the wave may take the form of a clumsy attempt at adjusting the rear view mirror. A last word about waving: always wave at Rolls-Royces, they crave a feeling of acceptance.

Regarding the joker in the Merc (is it a Mercedes or a Mercury?) who wants to race. If it means racing on Rt. 22, by all means don't do it. Better to be a coward with wheels than an ex-drag champ pedestrian. You'd also find running a rally in Keds quite tiring.

Here are a few more tips, straws in the wind as it were. Caps are definitely on their way out and those with buckles in the back are so far out that they are in the same category as pilotes who talk about lubricating with castor oil and assembling Ferraris with beef fat. Hooded sweatshirts (no writing on the back) are coming in and ski parkas are acceptable provided they don't have too many ski area patches. Sneakers should not be worn in gymkhanas until you have won at least one trophy and if you become a consistent winner, a battered pair of "lucky" shoes may be substituted as a talisman.

Cars driven with the windshield removed should never be washed and a few dents on the flanks and grille (not the rear) add a nice touch. Obscure national origin signs are showing increased popularity with a fringe group and CD plaques (for Corps Diplomatique) are especially in demand among VW owners and drivers of rhd A-40s. Taped-on racing stripes should be avoided and those which are painted on should not be chosen to match the car colors. Painting around the grille opening is better yet and use of the words Scuderia and Ecurie is losing ground to the Anglo-Saxon "Team."

Regarding your being put on a committee, there's nothing we can do to help you — you have only yourself to blame. This, you should have realized, is one of the biggest dangers of belonging to a sports car club; you almost always have to do something unless you are skillful. It's a question of survival of the craftiest — strictly the result of genes and chromosomes. No amount of practice will help; you've either got the will to avoid work or you don't—it's hereditary. We're sure even in the Heel and Toe Sports Car Club there are respected members of long-standing who have successfully avoided doing a jot of work. The trick is to appear active without actually doing any-

thing. The people who have this talent are the pillars of the sport, they have made it what it is today. While it may be said that you only get out of an organization what you put into it, if you get anything at all out while putting nothing in you are ahead of the game.

NO DUES

We have an informal club for Sprite owners called "The Spirited Sprites!" and would like to invite owners of the cars to join us. This is a non-dues-paying group to trade information about Sprites.

G. R. Crenshaw
1061 Northern Boulevard
Roslyn, New York

FABULOUS ROADHOLDING OVER 145 MPH

I've enjoyed very much your April issue. I found very interesting the articles "The Most Fantastic Grand Prix Car" and, specifically, "Racing Cycle Engines."

I don't understand why the author didn't include in the categories of outstanding motorcycles Great Britain's 1100 cc Vincent H.R.D. "Black Shadow."

I was a motorcycle racer in Argentina and I (like many others that were able to buy it) chose the H.R.D. for its astonishing power-weight ratio and its fabulous road-holding at speeds of 145 and over.

The late Argentine champion, Telmo Piovano, had his own motorcycle with these characteristics: 1100 cc, 14 to one compression ratio, 90 bhp, 400 pounds.

While other bikes were much heavier and not so powerful as the H.R.D., its supremacy in races was unquestionable in the years 1948 to 1953 until the International Formula was reduced to 500 cc.

Eduardo Ferreyra
New York, New York

Taken as a complete racing bike, the big Vincent is cetainly an outstanding machine, but Mr. Kirbus was mainly concerned with engines producing high power per cubic inch. The H.R.D. of course produces high power by having lots of inches!

ANTIQUE ALFAS SOUGHT

The Alfa Romeo Owners Club, now in its third year, is an international organization of 700 members and is sanctioned by the factory. To date, AROC has directed its energies through a monthly newsletter to owners of current Alfa Romeo models.

This attention will continue but the club recently formed a Vintage Section directed to the needs of owners of all out-of-production Alfas. We are anxious to locate such owners anywhere in the world and, of course, hope to be of continuing assistance to even more owners of Giuliettas and 2-liter models.

Membership in AROC is open to all Alfa enthusiasts and interested parties should contact the club c/o P. O. Box 427, Evanston, Ill.

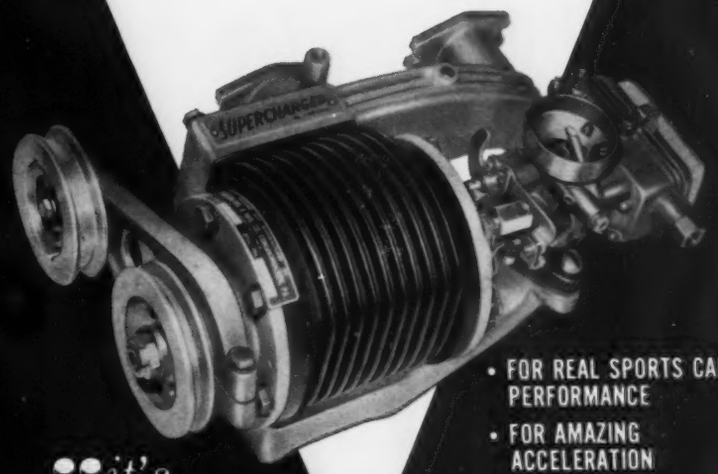
Dic Van der Feen, Editor
THE ALFA OWNER

HAVE SPORTS CAR, WILL WRITE

Congratulations on such an excellent magazine. "Have Sports Car, Will Write." I have recently become a sports car fanatic and would like to correspond with others.

(Continued on page 8)

SUPERCHARGE
with
JUDSON



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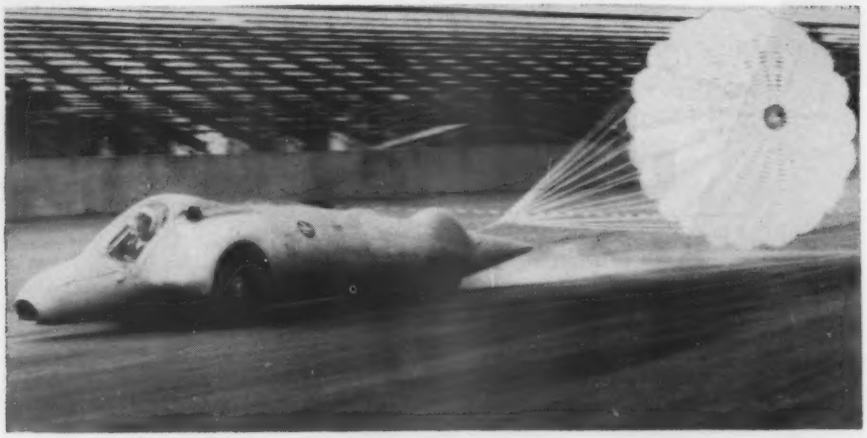
☐ MERCEDES 190 SL ☐ VOLVO

SALT FLATS OR SPEEDWAY



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(Continued from page 7)

I am 20 years old, occupation, bank bookkeeper. I am saving like mad to buy a sports car.

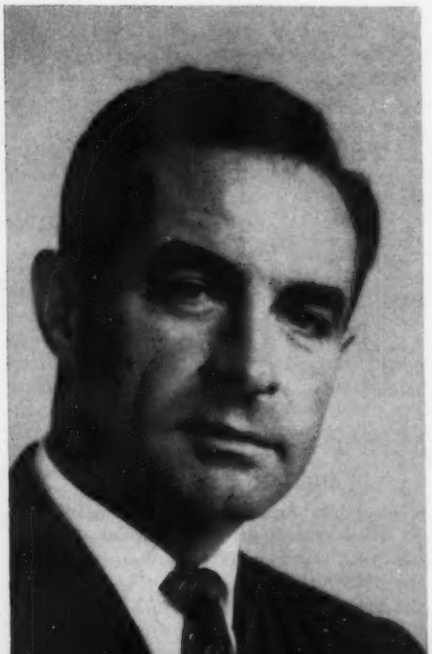
Sharon Lee Kennedy
R. D. 3
Dansville, New York

AN AMERICAN ABROAD

Thank you for the coverage you gave to our new Taunus 17M in your January issue. However, one correction — you stated that Mr. (Wesley P.) Dahlberg had spent a preparatory three years in the United States. Actually, he spent most of his life in your country and only the past three years in Germany where the new Taunus 17M was developed.

Incidentally, you may be interested to know that in breaking away from the "current European Angular trend," the Taunus's new form has stimulated widespread enthusiasm among writers and the public. Its great success in our world-wide market seems to mark it as an important new approach to production car styling.

Robert W. Zvanetti
Foreign Press Service
Ford-Werke Aktiengesellschaft
Koln-Niehl
Germany



Mr. Dahlberg, above, was born in Muskegon, Michigan, Sept. 24, 1917. A graduate of the Carnegie Institute of Technology, he served as an art instructor at Washington University in St. Louis, Missouri. Prior to joining the Ford Motor Company in 1947, he served four years in the Air Force and was associated with product design firms in Minnesota and Washington state. He was appointed head of the Ford of Cologne styling division in 1958, an assignment which included development of the Taunus 17M.

MORE ON MONZA

I have just finished digesting your April issue. The book literally screams the

"Hooray for me, I'm an American" attitude voiced by many pulp hot rod magazines.

In reply to your Observation and Opinion column I would like to impress a few points upon you:

1. Monza is a highly-specialized track, in no way resembling a road course, and requires a type of machine suitable for no other race in the world except perhaps Indianapolis.

2. Monza is notorious as the world's most poorly maintained high-speed course.

3. In 1959 two Jaguars provided the only competition for our Indy boys at Monza. At that time the British were highly praised. Also, your hero Enzo Ferrari refused to build a car for that race, though he is noted for overnight construction.

Please note the postmark on this envelope. New York has not been part of the British Empire for some time.

Fred O. Hayes
Jamestown, New York

Let's look at the facts.

1. Not so. The full Monza circuit, over which the Italian G.P. was run last September, measures 6.2 miles in length. To be sure 2.6 miles are run on the concrete-banked section, but the rest is a classic, very demanding road circuit. It demands a road-racing car of extreme versatility, not a specialized car at all.

2. Hardly! The banking is bumpy because its construction was rushed in 1955, but it and all the level stretches are maintained on a standard equal to any in the world. If it's bumps that bother you, how about the cobblestones at Oporto—"so bumpy it made your eyes blur," according to Phil Hill. What the dickens are suspensions for, if not to cope with bumps?

3. The year was 1957, and three Jaguars were on hand, not two. There certainly was praise for the Ecurie Ecosse, which entered the D-Types, but not for the since-extinct International Union of Professional Drivers which was formed apparently for the sole purpose of boycotting this race in a manner that was recalled to mind by the British boycott of 1960. Ferrari had planned to build a car but it wasn't much use if none of the ranking drivers would get into it—the same situation Cooper and Lotus were in last year.

After the 1957 event was run off in perfect safety, all the drivers realized how asinine their boycott was and most of them were on hand to drive in the 1958 Monza 500. Ferrari finished the car he'd planned to build in '57 and the unforgettable Luigi Musso qualified it faster than all the Indy cars! That's not bad for a first serious try at track racing—certainly better than America's first serious try at G.P. racing last year, though that's not the point.

FAN MAIL

Congratulations. The first issue of your magazine under the CAR AND DRIVER banner is also the best to date. As a super-interested follower of motor racing, I was delighted to find page after page of material on the art.

My only complaint about the issue stems from the fact that our Bullock-Le Mans knockoff hubcaps were not associated with the Sprite RRR. We are still around as ads in June and August will show.

Warren M. Bodie
San Jose, California

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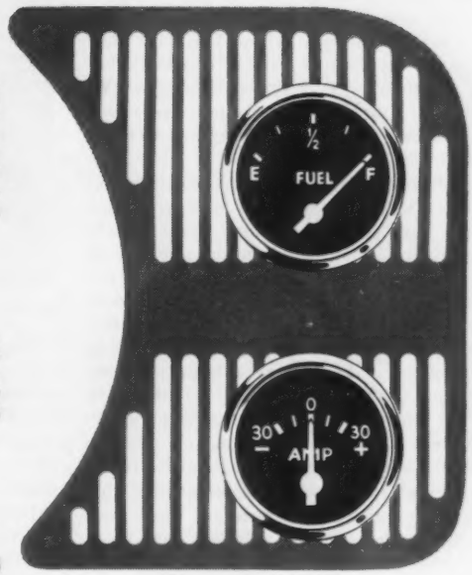

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EUROPEAN NEWSLETTER

B.R.M. V8 FOR FORMULA ONE

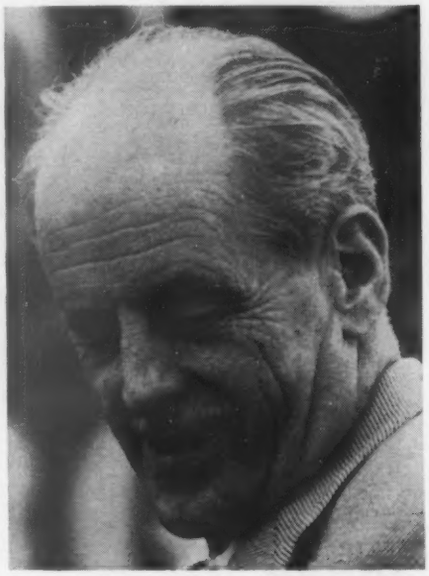
A lesson that Britain's G.P. car and engine constructors have learned is this: when you throw a wrench into the works, make sure it *is* a wrench and not a boomerang. After the F.I.A. had taken an irrevocable position on 1½-liter engine capacity as the basis for its new Formula One for 1961 *et seq*, the British, you recall, made a maladroit bid for a continuance of the 2½-liter limit. Inevitably, it failed, the only tangible result being that British constructors, clinging to hopes that it *might* succeed, were late off the mark with their 1½-liter designs. Now they're paying the price, lagging months behind Ferrari, whose acceptance of the new rules at birth enabled him to flaunt his all-new 120-degree V6 engine, and a chassis to contain it, before the world's press as early as the second week in February.

For B.R.M., formerly distinguished as the only British G.P. make using its own engine rather than the ubiquitous (and nearly invincible) Climax, the interim solution to this power gap problem was to wait in line for admittedly outdated Climax fours, and thus have *something* to field while the Bourne savants were crash-programming their answer to Ferrari. This, as we reported in February, is a 1½-liter V8, limited but intriguing details of which have since been disclosed to *C/D* in an exclusive interview with chief designer Peter Berthon.

Designed for rear placement in the currently unanimous fashion, the new B.R.M. engine is an all-alloy job with the main casting comprising the crankcase and cylinder blocks, the latter, like the fours of yesteryear, using iron liners but with the difference that instead of being screwed into the detachable cylinder heads they're pinched down on rubber sealing rings. Dimensionally, Mr. Berthon was unspecific, but he stated that two alternative blocks, oversquare to differing extents, were in the works. The oil pan is a separate magnesium alloy casting, located under the crankcase.

A Nitralloy crank, with journal diameters of around 2 inches, runs in five Vandervell lead-indium main bearings; the big ends are plain too, neighboring conrods running side by side. The two pairs of overhead camshafts are gear driven from the front of the crank. These, and also the camshafts, ring changes between ball and roller bearings.

Although it isn't true, as conjectured elsewhere in print, that this engine is in effect an upscaled half-chunk of the old supercharged V16, it embodies lessons learned from both of B.R.M.'s earlier engines. It discards hairpin valve springs, which Mr. Berthon describes as "unpredictable", and also, as mentioned above, the screw-in method of cylinder sleeve location. It uses a derivative of the four's oil pumps and the Lucas fuel injection system featured experimentally on the 2½-liter powerplant in late '60 races. Breathing arrangements also reflect past experience: there are two valves per cylinder, and these, although their actual size wasn't ascertainable, retain the same inlet/exhaust ratio as the four, likewise the same proportions between inlet valve diameter and cylinder bore. (To refresh your memory, inlet and exhaust valve diameters on the four were 2.4 inches and 2.0 inches respectively. Cylinder bore was 4.05 inches.)



Berthon, chief of B.R.M.'s F.1 V8 crash program.

Abandonment of rocking fingers between cam and valve stem, in favor of direct attack, marks another departure from B.R.M.'s 16- and 4-cylinder practice. As regards means of returning the valves to their hardened ferrous seats, it's a half-truth to list hairpin springs among the throwouts: at this writing, development is proceeding on alternative systems — desmodromic and spring-homing using conventional coils. In '58, you'll recall, desmo valve gear was tried experimentally on the four, but no improvement in performance resulted. Included valve angle isn't disclosed.

Initially and briefly, carburetors (presumably dual-throat Webers) may be used if progress with f.i. lags; the next stage will be port injection, probably followed at a future date by direct squirts into the combustion chambers themselves. The V8's pistons, as on the later fours, are alloy forgings, giving a compression ratio in the 10 or 11 to one region.

With eight unsupercharged cylinders and a total displacement as low as 1500 cc, says Berthon, the crux of the design problem is getting a high bmep figure at the fast crankshaft speeds envisioned; how, in other words, is good filling to be achieved during the necessarily short valve opening periods and with nothing to push the charge in?

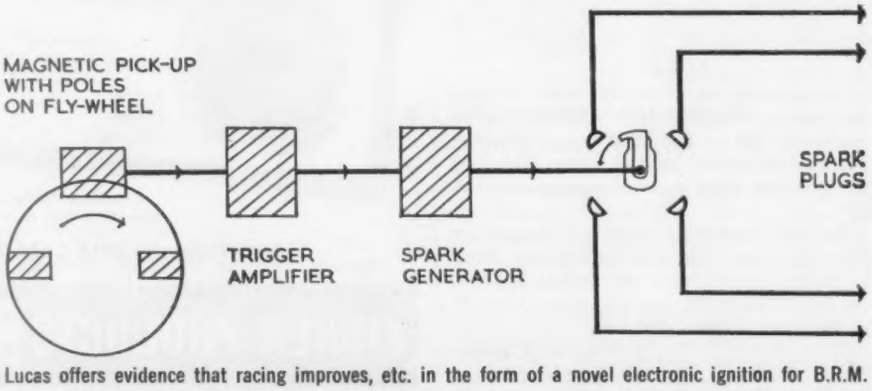
The key to the puzzle, he says, is the valve acceleration rate, which in turn is controlled by cam form and the method of "harnessing" this form. In the latter factor we may have a clue, albeit a vague one, to something fairly novel in the V8's valvegear. Incidentally, modern multi-cylinder motorcycle engines — at which most designers of G.P. powerplants allow themselves an over-the-shoulder glance — are not, generally speaking, outstanding for low-end bmep, which explains the cycles' five- and six-speed transmissions. The new B.R.M., by the same token, will have a five-speed box, similar to the one used experimentally last year with the four. By the time this is published, the quintette box will have undergone race testing on the B.R.M.-Climax.

NEW LUCAS IGNITION

In place of magnetos, the V8 is to have the new electronic ignition system developed for racing by Lucas, specifically designed to cope with high compression ratios and the 8,000-12,000 rpm expected of the next generation of F.1 machines. Its makers say electronics will definitely not be used for "popular ranges of cars", but who knows the way popular cars are going to move in the next decade?

The Lucas system goes a lot further than some already described which use a transistor to take the load off the contact-breaker in existing set-ups. These have some advantages (reduced wear, for example) but are still limited by mechanical design to about 400 sparks per second with a coil, 500 with magnetos. The electronic device gets rid of all mechanical contacts, triggering sparks electro-magnetically from the flywheel and cutting out the effects of backlash, wear and oscillation in the timing drive. Constant spark voltage is reliable up to 1000 sparks a second. Briefly, a magnetic pickup receives a very small impulse whenever accurately placed pole-pieces on the flywheel pass through its field; the

(Continued on page 12)



Lucas offers evidence that racing improves, etc. in the form of a novel electronic ignition for B.R.M.

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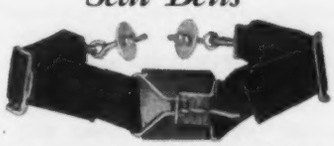

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(*Continued from page 10*)

impulse is magnified by a trigger amplifier (by cutting off current in the primary winding of a transformer) and the higher voltage in turn feeds the base circuit of a transistorized spark generator. The regenerative oscillation which follows produces a 20 kilovolt secondary voltage with a cycling time for the whole operation of less than 200 microseconds. A normal distributor feeds the current to four spark plugs. One snag which F.1 designers will have to face is the current requirement, which is directly proportional to speed and rises from 0.25 amp at 50 sparks per second to 10 times that amount at 500 sparks per second, suggesting that either bigger batteries or generators are going to be needed. Other new items from Lucas include a centrifugal electric fuel pump which runs submerged in the gas tank, a three-bladed windshield wiper and a thermostatically-operated radiator fan. The XKE Jaguar uses all these except for the electronic ignition.

Returning to the B.R.M. V8, it uses one 10-mm spark plug per cylinder; the fours had dual ignition.

The extra width and reduced height of the V8 engine has necessitated designing a new chassis for Bourne's '61 Grand Prix contender, though the suspension follows the 1960 layout fairly closely. The car's main dimensions—wheelbase, tread, overall length—are all shrunk slightly, and the center of gravity is lowered. Frontal area is down a piece, too. Adoption of outboard disc brakes at the back, replacing the single transmission stopper that's had so much to answer for in the past, has not, it's stated, incurred any penalty in unsprung weight.

SWISS DEBUT FOR THE XKE

The first public showing anywhere of the XKE Jag brought throngs to the Geneva automobile show with the Jaguar stand mobbed from opening to closing time. Sir William Lyons himself was on hand along with chief engineer Bill Heynes to celebrate the occasion. Everyone was climbing in and out of the E-Type coupe including President Wahlen, of Switzerland. Swiss Jaguar distributors had so many orders for the new car during the show that they weren't sure they could possibly cope with them all. AUTOCAR Tech. Ed. Harry Mundy was invited to speak over the Swiss radio network and proclaimed the E-Type as a "clear-cut personal triumph for Sir William Lyons." We go along with this not only for Bill Lyons but also for the sharp, small group of engineers that he has had with him practically since the Swallow side car days. This point is all-important; it takes talent to build good cars and know-how does not come by chance; the factory with the best brains in the design office is the one that's going to show the way to the rest. In this connection, former European Junior Champion and brilliant automotive engineer Michael May has been working for Rudolf Uhlenhaut at Mercedes for some time now.

FASTER FACELLIA AT GENEVA

Facel brought out its faster version of the Facellia at Geneva. It's the "F-2-S" and has twin two-throat Weber carbs. The compression ratio has been raised slightly and power output on this version is 126 bhp at 6400 rpm. Numerous small but meaningful changes have been made to the Facellia since its introduction. These include servo-assisted disc brakes, faster steering, a reduced diameter steering wheel and a hydraulically operated clutch. It appears that the entire car has been gone over with a fine tooth comb in a real effort to eliminate some of the faults of the initial production models. Top speed of the F-2-S is reported by the factory to be 119 mph.

FIRST NEW F.1 RACE

The first race for 1.5-liter Formula 1 cars was held at Pau on Easter weekend, and the historic event was notable for the lack of novelty on the starting grid. Except for the two Emerysons, it was last year's Coopers and Lotuses—powered by last year's Formula 2 Climax engine. The race was led from start to finish by up-and-coming Jimmy Clark in his Lotus; he beat Champion Jack Brabham into the first corner and stayed out in front. Jack eventually retired due to a faulty fuel pump drive. The following weekend saw Brabham take the Brussels race, closely followed by teammate Bruce McLaren. Making a comeback, Cliff Allison finished fifth at Brussels; Moss suffered from engine troubles in practice and in the race could do no better than sixth with his Lotus. Bonnier and Gurney went well while their Porsches held together but neither of them figured in the final classification.

PORSCHE 8 FOR FRENCH G.P.?

The Porsche eight-cylinder racing engine for 1961 is slowly but surely being prepared for its debut either at Rheims for the French Grand Prix (July 2) or at the German Grand Prix (August 6). An inability to get castings made up quickly in Germany is one of the biggest headaches and any slight changes in design mean long delays in getting the final casting delivered. This powerplant won't come into its own until 1962 and in the meantime—on paper at least—Ferrari would seem to have the necessary goods to get the job done. First baptism of the new 120-degree V6 Ferrari engine will be at Syracuse and if most of the English teams turn up for the meeting it could provide a clue to the direction of the season. The Targa Florio follows only a few days later so most people will be spending eight to ten days in sunny Sicily. This is the only race in which Porsches have a real chance at an outright win and the inevitable Ferrari-Porsche battle will ensue again this year—likewise with the opposition of Maserati's latest Birdcage.

POTENTIAL ACES

Newcomers to Formula 1 events this year include young Jack Lewis and Trevor Taylor. Lewis will no doubt have a factory Cooper drive most of the season while Taylor works for Colin Chapman. Lewis is smooth; he did a sharp job at Pau, being fast in practice but finishing only fifth in the actual race.

The Emeryson-Maseratis run by the Ecurie Belge have livened up the starting grids; driven by Lucien Bianchi and other Belgians such as Mairesse and Gendebien, these cars have good road-holding but suffer from not-too-reliable Maserati engines. Why didn't Ecurie Belge buy a Cooper or a Lotus? One of the answers is that with a different name of car for the grid, they'll get entries easier and quicker. If it was just another Cooper, the organizers wouldn't be so quick to let them start in over-subscribed events.

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TECHNOTES

JOWETT JUPITER

I have the opportunity to buy a sports car called the Jowett Jupiter. I understand that it's been out of production for some time and, to my distress, I can't find the specs or any information concerning it. Can you help? I would especially like information concerning replacements for the engine.

Melvin Brunson
Carbondale, Illinois

One of the nice things about the English is their loyalty to the long-suffering customer. Though Jowett Cars, Ltd. went out of business several years ago, a successor firm, Jowett Engineering, Ltd., remains. They offer spare parts, reconditioned units and even service facilities to the loyal owners. Their address is (and we've checked this, it's not a typo): Mowden Clough, Birstall, Batley, Yorkshire, England. Phone number is Batley 1950, but beware the Yorkshire accent.

For the youngsters present, the Jowett Jupiter came out in 1951 or 52 (or maybe 1950, judging by the phone number). Even today, it would be considered novel and modern. Features were a flat-four, water-cooled 1½-liter engine (See the Lancia Flavia Road Research Report this issue. Ed.) up front with rear drive, a gorgeously rigid tubular frame and wind-up windows. Troubles were Porsche Supers in competition and head gasket and crankshaft breakages under the hood. The Series III engines solved these, but came too late to save the firm's faltering reputation.

Our advice: caveat emptor, *but if it appeals to you, remember that's the same advice we used to get about buying our first MG!*

RUNNING ON

Three friends and I have the same unnerving problems with our four different cars, (MGA, TR-3, Metropolitan and Volvo). The problem starts when the ignition is turned off. The engine should stop but it runs on as if it were trying to tear itself loose from its mountings. If I'm in a hurry and don't want to wait for its gasping, dying breath, I can stop it by engaging the clutch while in gear (brakes on, of course). This may not be very good for the clutch or transmission, but letting the engine run on would seem even more harmful.

What we'd like to know is:
What causes running on?
How can we get rid of it?

F. T. Heimbuch
Freeport, Illinois

The theory of engine operation is that the fuel-air mixture is ignited by the spark at the spark plug. The fact is that it can also be ignited by any extremely hot item in the combustion chamber, whether it's a glowing red fragment of carbon de-

posit on a valve head or the piston crown, a sharp edge of spark plug thread that's equally hot, a partially burned away exhaust valve that's overheating because it no longer seats well enough to transmit heat to the valve seat, or (and this is the first, easiest thing to check) a spark plug that is of too "hot" a heat range for your engine under the conditions in which you drive it.

About the latter, if the previous owner of your car drove it gingerly his garage may have recommended rather hot plugs to make up for the fact that he ran his engine rather cold (i.e., mostly small throttle openings). If you're used to hot-dogging around town, you may be burning up those "hot" plugs. Look at them after a full throttle run. Cut clean, as they say, that is switch off simultaneously with closing the throttle after several seconds of wide-open throttle in third.

If the insulator's white or even blistered, try a "colder" plug. If two plugs off the same carb are offbeat, check your carburetion.

In the meantime, you can "quench" your engine by stamping full throttle just after *switching off. The sudden inrush of cold air will chill the hot spot faster than it can ignite the fuel.*

The rough running characteristic of running on? That's because you're missing on half your cylinders. Things could be worse; you might have smooth running on, hitting on all four!

FALCON WITH MGA WHEELS?

I own a Falcon Ranchero and an MGA. It appears to me the wheels are interchangeable and a perfect fit. I would like to put my 15-inch MGA wheels on the Falcon (13-inch) and get an extra inch or so of clearance when I go to the mountains. Would it be safe?

L. K. Lopey
Martinez, California

Sturdy as the MG is, I think putting 35% more weight on the (front) wheels and then going jouncing over bumpy roads or cross-country is just asking for trouble, without even getting into the possibility of how heavily you might load your Ranchero. Sure, MGs are raced, but so are some Falcons. Designers always try to save weight in the wheels by designing them close to the limit because weight saved there is unsprung weight.

If you're serious about making changes, here's a suggestion, though it entails more work: Put one-inch thick, circular spacers between the front coil springs and the suspension to jack up the front end. Have a spring shop (see your classified phone book) re-arch your rear leaf springs to give an inch or even more clearance at the rear (more if you travel heavy).

FACTORY HOP-UP

Ford is offering a 390-cubic-inch V8 developing a claimed 1 bhp for each 1.5 pounds "the most favorable in the industry," according to M. L. Katke, Ford's engine division gen'l mgr. It has three two-throat carbs, aluminum manifold, progressive carb action and develops 430 lb-ft of torque. Called the Ford 390, other options are "390 T'bird Special" and 390 high performance special with one four-barrel carb. The engine is available on any '61 Ford.

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Note the Bill Parry Racing Coveralls, please.

These are brand new and, we believe, the ultimate in such garments. The pair I'm wearing (that's me at the left) is the two-piece model which, believe it or not, doesn't come all undone. The pants are roomy in the right place, the shirt is gathered and won't ride up. Sleeves are semi-raglan permitting activity without sloppiness. The zippered front has a button collar, open in the pits, closed in the car, wrists and ankles are elasticized. There is a multiplicity of pockets, four in all, each closed by a zipper. The one-piece type, worn here by Tony Settember, has the same features. (Frank Monise in the Lotus is in his B.V.D.'s but you can't see him, anyway). The suits are tailored from the lightest Dan River combed poplin (wt. 19 oz., most of which is zippers & belt buckle) a drip-dry, silicone-treated, wrinkle-shed material that takes fire-proofing beautifully. Colors are: White, Red, Blue, Black and Grey. Sizes: S, M, L, X-L and Long.

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DETROIT NEWSLETTER

by Roger Huntington

When the Big Three brought out their new compact cars in the fall of 1959 (Corvair, Falcon, Valiant) some observers predicted that the trend to lower initial cost, as such, wouldn't last — that the real underlying appeal of these cars lay in their smaller *size* and lower *operating* costs. A couple of recent developments would seem to back up that prediction.

Consider: within a space of two weeks this spring new luxury compact models were announced by Comet, Falcon, Buick, Olds and Pontiac. I refer to the Comet S-22, Falcon Futura, Special Skylark, F-85 Cutlass and Tempest Le Mans. All these cars feature bucket seats with a console-type panel between the seats, luxury upholstery, special exterior trim, in some cases a special engine power pack as standard equipment; all are based on two-door sports coupe bodies — and all cost considerably more than their original utility counterparts, as much as many well-fitted "big car" models. They can be considered economy cars only in terms of gas mileage.

Perhaps this evolution of the American compact car along more luxurious lines was inevitable. But this new sport flavor is a surprise to many of us. The car enthusiast tends to think of a sports-type car in terms of top performance, so we might expect our top-performing big cars to evolve along sporting lines. But it's apparently not going to be that way at all. Chevrolet started it all with the Corvair Monza series, of course. This is one of the few bright spots in the current sales picture; as this is written about half the total Corvair production is in Monza models. This sparked the other companies. Whether the other new luxury sports coupes will be as successful as the Monza remains to be seen. I did feel that the Corvair, with its unusual engineering features that could be appreciated by the car enthusiast, made a more logical candidate for a sports-directed evolution. It wasn't selling as a utility car anyway; the sports theme was about the only way out—and fortunately it caught on. The only other compact that might qualify in this category would be the Tempest with its transaxle, etc. So it will be interesting to see if the newest sports compacts do as well as the Monza.

SMALLER BIGGER ONES

While the compacts tend to evolve upward, we find a significant trend in which the big cars are definitely squeezing *downward* in size. The prime example so far, of course, is the '61 Lincoln — but practically all of the '61 big cars are at least an inch or two shorter and narrower than preceding models. The real bombshell of this trend will be dropped next fall or spring when Ford and Chevrolet bring out their new "senior compacts". These cars will have wheelbases around 115 inches, overall lengths between 195 and 200 inches, and will weigh between 2700 and 3000 lbs. In size they will be right between, say, an Olds F-85 and a full-size Chevy or Ford. Many observers believe this size car will be the prototype of the typical family car of 1965. In other

Buick's Skylark with a padded top represents the newest breed of compacts, economical but luxurious.

A trim sports coupe body with deluxe interior appointments adds new flair to the Olds F-85 Cutlass.

words all the "full-size" cars will eventually shrink to around this size, or only slightly larger. Weight might go as high as 3500 lbs., horsepower to 350 or 400, depending on performance requirements — and the price range is anybody's guess. The one essential ingredient is *compact size*. This would seem to be the true trend of the future.

Falcon Futura interiors echo T-Bird styling.

What's surprised us all is the swiftness with which the thing is developing. A year ago we were talking in terms of 1964 and '65 when we might notice the luxury trend in the economy compacts and the gradually shrinking size of the big cars. Now it begins to look like, by that time, all American cars will be compacts — and the true economy type car will be in the Volkswagen size class. Time will tell.

WHERE WERE THE RAMBLERS?

A lot of enthusiasts are wondering what was behind the withdrawal of the American Motors Ramblers from the recent Mobilgas Economy Run. I've checked into this and found sound arguments on both sides (A.M. and USAC, the officiating organization). The main part of the controversy centered around the Rambler American Custom models entered in Class A, for compacts with manual transmissions. According to the letter of the rules these models were definitely eligible for this class. The model was even shown on a list of eligible cars sent out by USAC last November. Then, later on, the USAC Board of Stewards met and ruled "that the intent and purpose of Class A required that all entries in this class must be with the lowest-priced model." The American Custom couldn't qualify in this case because the high-compression overhead-valve engine, luxury trim, etc., put the base price above the bread-and-butter DeLuxe and Super lines. But there wasn't a word to this effect in the official 1961 Mobilgas rules. A.M. officials felt they were gypped on this — and rightly so, I think. (I might also venture the opinion that the American Custom with optional overdrive would've had a good chance of recording best mpg of the event. They took the first six places in the recent Pure Oil Economy Trials at Daytona Beach, with a top mpg figure of just under 27 — and the operating conditions there are much more strenuous than in the Mobilgas run.)

A secondary hassle developed over the Rambler carburetors. A.M. had made a running change in jetting on the Holley 1904, prior to the USAC deadline of January 23 for engineering changes on '61 models. USAC officials were notified of the change by registered mail prior to the deadline. The communication never again came to light. But USAC officials say the new carburetors were not on the cars selected at random for the run, dealers in the Los Angeles area had no knowledge of a carb change, the new carb was not on the Rambler factory test cars, and that team captain Les Viland could not produce one for examination. A.M. says Viland *could have* produced one for examination, but that USAC tech inspectors refused to consider it. A.M. says the last straw was when two Comets and two Tempests were allowed to change to more economical axle ratios after the cars were selected at random.

So A.M. withdrew the cars completely. It's too bad it all happened. There are legitimate arguments on both sides: USAC tried to apply the *spirit* of the rules as well as the letter by barring a relatively low-production option combination that might not represent the typical Rambler American. The carburetor hassle could've been nothing more than a communications foul-up. But A.M. has got a gripe, too. When any competition organization starts playing fast and loose with the *letter* of the rules they've got big trouble. The Mobilgas people have kept their famous annual event remarkably free from scandal for years. Let's hope it blows over and is forgotten. —*RH*

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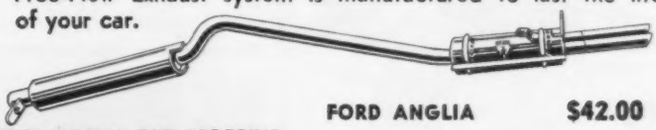

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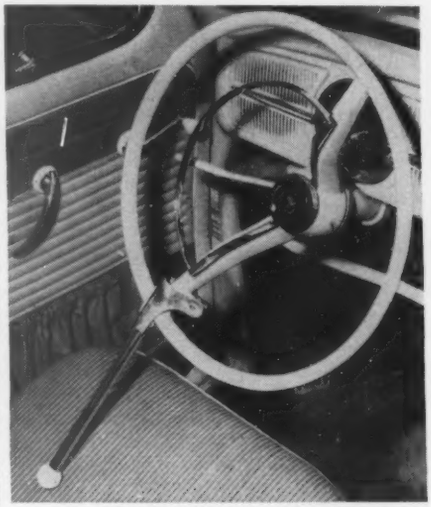
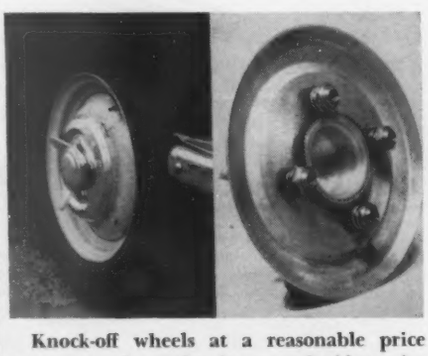
PIPELINE

An ingeniously simple and utterly effective **Anti-Theft Device** is among the items inspected this month. Consisting of a tool steel bar that clamps to the steering



wheel rim and spoke, the lock limits the amount the wheels can be turned since the bar becomes obstructed by the door, the windshield or dash or the seat. It would appear to be a reasonable $9.50 investment, since the device can be switched when you change cars and it's obvious enough that anyone trying to hacksaw it would be suspect. Two keys come with the unit which is available from Spies Trading Co., Inc., Dept. C/D, 30 E. 20th St., New York City. In Germany where the unit is made, it's called the "Auto-Bobby."

Transistorized ignition is due to make its debut . . . Autolite has done considerable testing of the units and expects to make them available later this year. It appears however the units will not be adaptable to most British cars and others with positive ground . . . is this why Rolls-Royce has gone to a negative ground?



Knock-off wheels at a reasonable price are a much-sought item and Alexander Engineering Co. offers a conversion that enables drivers of BMC "A" cars to use their original disc wheels. The unit consists of a spinner attached to a large-diameter gear. Four smaller gears, corresponding to the hub nuts rotate when the spinner is rotated and the wheel comes off in a trice. A set of four, priced at about $60 including a hammer, is available from Alexander Engineering Co., Ltd., Dept. C/D, Haddenham, Bucks, England.

The Model 500 Mileage Minder, **Fuel pressure regulator and filter** is available from the Mileage Minder Co., Dept. C/D, 3380 17th Street, San Francisco 10, California.

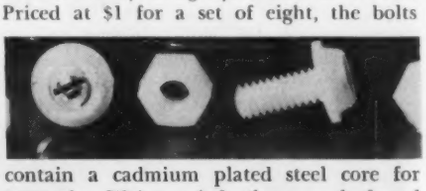
Solex carburetor repair kits are priced

at $2.95 to $3.40, depending on the car, and are offered by the Arnolt Corporation, Dept. C/D, Argonne Road, Warsaw, Indiana . . . **Prices have been cut on the European delivery rates for Renaults** ordered through Cars Overseas, Inc., Dept. C/D, 425 Park Avenue, New York City. For example, the new Gordini with four-speed transmission goes for $1205, while Caravelles are as ow as $1683. The firm claims **up to $595 can be saved** on the purchase price of a Renault or Peugeot by buying it in Europe.

Cheaper than installing a pit in your garage, **portable ramps for servicing** your car are available from United Industries, Inc., Dept. C/D, 120 W. Broadway, Minneapolis 11, Minnesota. Priced at $69 a pair (add $7.60 for the side stool), the ramps will each support 2000 pounds . . . .

A handy item for car owners, **anti-corrosion oil** from Morse Instrument Company, Dept. C/D, 21 Clinton Street, Hudson, Ohio is said to be impervious to water. Good for all exposed nuts, it can be used with bronze wool to remove rust from chrome too. Contact the company for details.

Elimination of rusting license plate bolts is achieved by using **nylon nuts and bolts.** Priced at $1 for a set of eight, the bolts



contain a cadmium plated steel core for strength. We've tried them and found them satisfactory in every way. They're available from A. Bartz, Dept. C/D, 114 West Kinzie Street, Chicago 10, Illinois.

Locking gas filler caps for MGAs and Triumphs are available from Bakers Worldwide Auto Parts, Dept. C/D, Box 57, Franklin Square, New York, and are priced, complete with adapters, at $10.95 each.

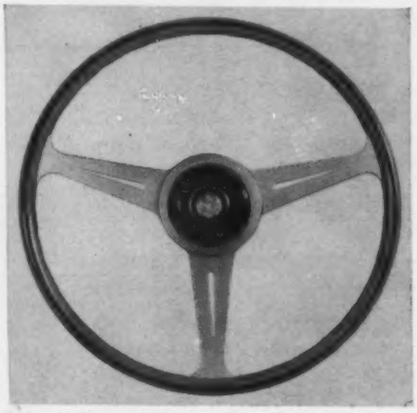
Usually the forgotten man in the auto world, the **used car buyer gets red carpet** treatment from Saab. When one buys

a used Saab from a Saab dealer, a free six-pack of Saab oil comes with the car. In addition, the used car is registered with Saab in New York and the owner receives a small kit in the mail. The free kit includes a letter of welcome from Ralph T. Millet, Saab president, an owners' manual, a booklet entitled "Knowing Your Saab" and a Saab lapel button.

Bissell, known for its home care aids, has produced a **car interior cleaning kit.** Priced at $3.98, it includes a 13-oz. bottle of concentrate that's effective on leather, plastic and fabric and which when diluted with water as specified produced about a half-gallon of cleaner. Used with

the applicator there's a minimum of mess as the cleaner feeds through a sponge-brush unit. It's available at hardware stores.

An enthusiast's dream, the **Nardi steering wheel** adds a functional and good looking extra to any sports or G.T. car. Light weight, it's made from plated aluminum and has a hand-rubbed wooden rim.



Priced from $65 to $95, the wheels are available to fit just about any car, including those with adjustable steering. For full information, contact Vilem B. Haan, Inc., Dept. C/D, 10305-15 Santa Monica Blvd., Los Angeles 25, California. Include the make, year and model of your car. Nice as it is, the Nardi wheel is but one of hundreds of items available from Vilem Haan. Others include eight-day dash-mounting clocks and car covers.

Replacement **chrome-plated air filters,** using dry paper elements are being offered by ERDA, Dept. C/D, P.O. Box 276 Denmark, South Carolina. The housing is a heavy .050 cold rolled stamping, plated first with nickel and then chromium. Filters are presently available for 1¾ inch S.U. carbs as fitted to AH 6 and 3000, TR-2 and Volvo). They are very attractive, and when you read this they will be available for 1½-inch S.U.s (AH-4, MGA, Rover, TR-2 and Volvo). They are very attractive, adding a bright touch under the bonnet. Priced at $9.95 singly, they're $18.95 a pair. Replacement filters are $2.75 each.

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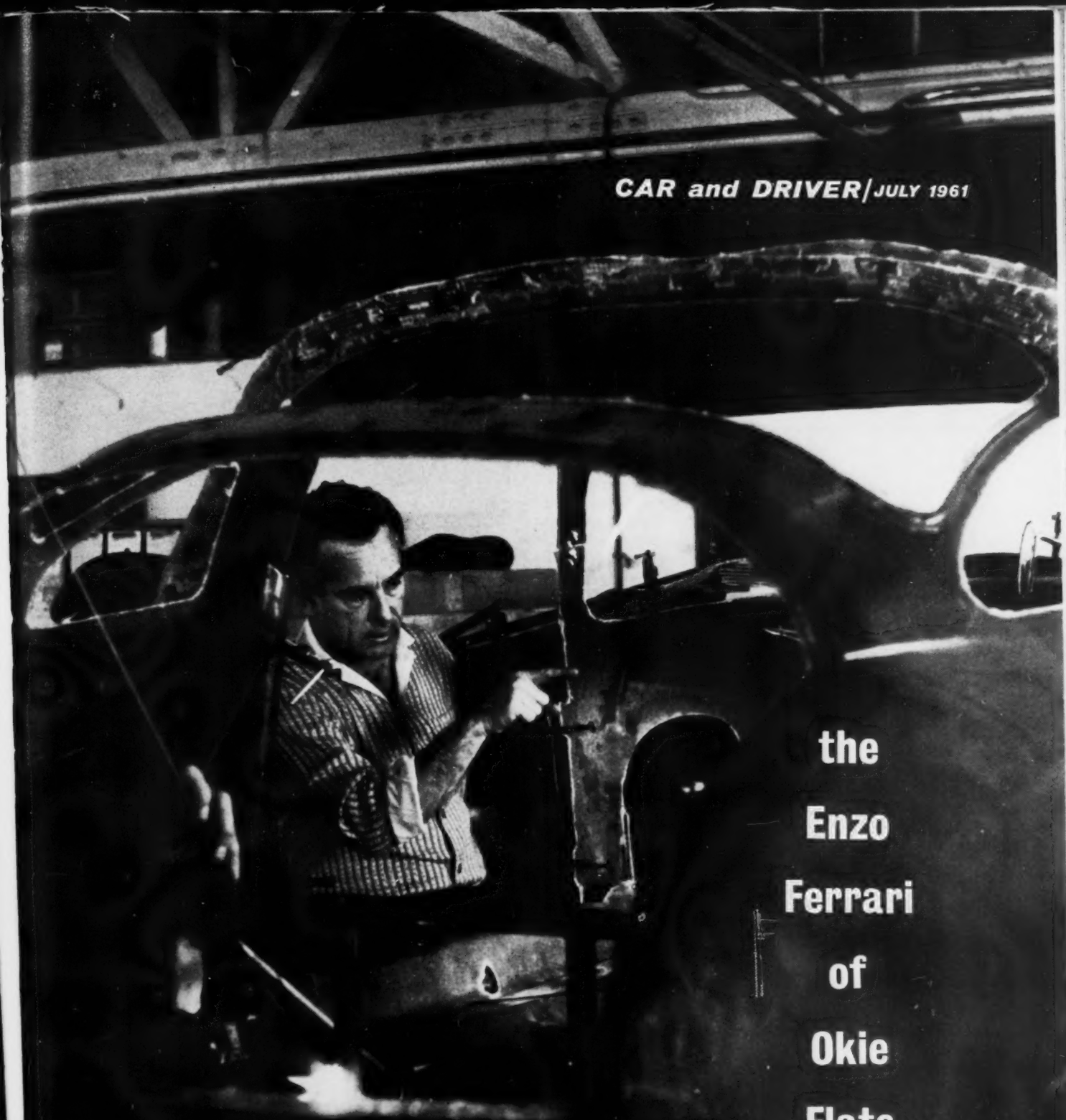


the Enzo Ferrari of Okie Flats

by Henry Manney

Bill Devin's colorful story answers the question, "Why ain't he rich?"

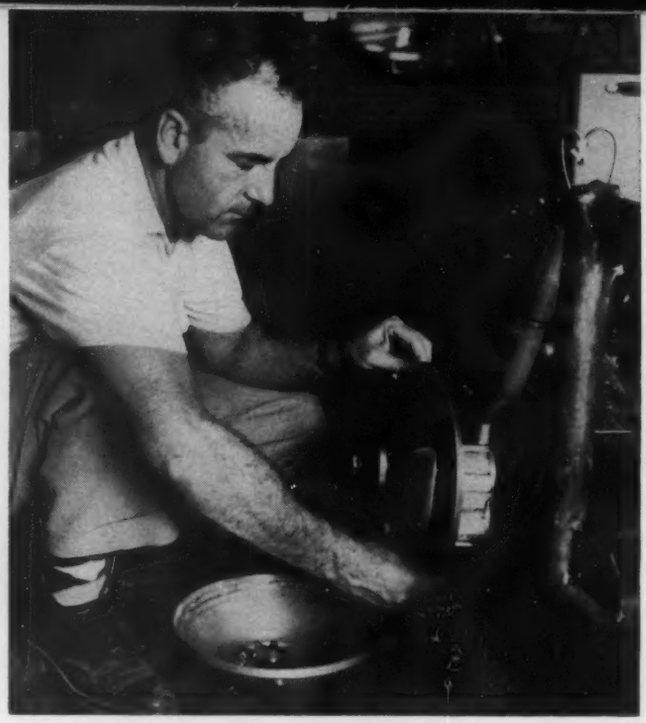
► Ever since the very start of the sports car movement Bill Devin has been in the thick of it . . . not necessarily a name to conjure with but generally the one doing the conjuring. Having been identified with specials for some time, it is not surprising that Devin Enterprises is at present engaged in the manufacture and marketing of two handy additions to the American scene besides its usual line of fiberglass bodies, de Dion rear ends, manifolds, and goodies of various descriptions.

The elder of these two cars, the Chevrolet-powered SS, has the very interesting specifications of tube frame, one of his bodies, de Dion rear and Girling disc brakes (of which more later) and from what I have seen looks like being a very nice car. They have not met with conspicuous success so far in competition, however, due to what appears to be lack of proper preparation, insufficient driving, too mild an engine, or simply racing bad luck rather than any inherent fault of the machine. Devin himself apparently couldn't spare the considerable monies to be able to race a factory car, which of course is the only way to get everything done just right.

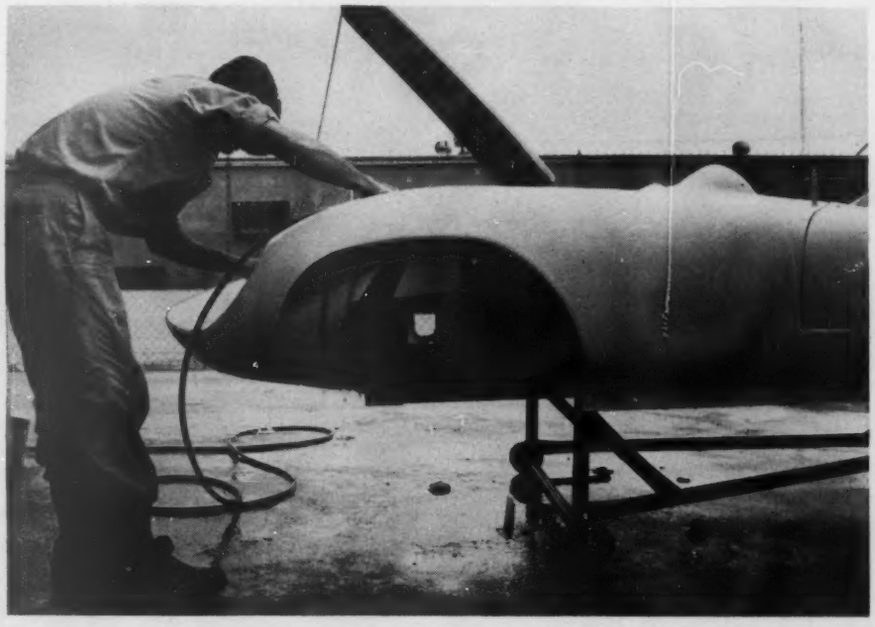
The new D, which has been in production for some time, supplies a long-felt want in providing a light and handsome fiberglass two-seater which uses inexpensive Volkswagen (or Porsche, for that matter) components, giving the customer useful and economical performance with reliability which will tend to keep him out of the clutches of expensive specialist shops. A great deal of thought has gone into this D, which may either be purchased as a kit or as a complete car. To a neat tubular frame of his own design, Devin attaches VW (or Porsche) trailing arms, shocks, steering assembly, wheels, and brakes at the front while at the rear one finds the complete *Heckmotor* package comprising engine, transmission-differential, swing axles, shocks, wheels and brakes.

For those customers who contemplate racing, want a little more poke or just don't want to meet themselves coming down the street, Devin can supply conversions of various strengths or Porsche mills including the 60 bhp commercial one, and to keep up with this increased performance he can provide Dayton wire wheels specially made for this car as well as self-adjusting disc brakes engineered by a gentleman named Cagle, who also manufactures units for Halibrand and aircraft. The usual changes can be rung on gear ratios to avoid that abysmal drop in the old VW box and the comparatively light weight of 1200 pounds with VW components (factory figure) ensures that you should have to look for the speed cops as least as often as the next guy.

If he's so smart why ain't he rich? is the classic question; the answer is of course that Bill is an enthusiast and it takes a mighty cold-blooded enthusiast these days to make a lot of money. Certainly there is no lack of mechanical experience in his life, a fact which is reflected in his sometimes unorthodox way of doing things and in the mechanical simplicity of his creations. He was born in Rocky, Oklahoma, in 1915 where his father had first a garage and then a Chevrolet agency. There were plenty of chances before he *had* to help with the shop to learn welding and construct weird and wonderful machinery, among them a blown-up Indian twin which he promptly converted to a single and installed in a nameless frame found mouldering in the back forty.



Devin himself takes an active part in the construction of his cars. Here he installs a disc brake unit on Fiat-Abarth for Roosevelt racing team.



It's a long way from Wolfsburg both in distance and in styling. The Devin D shell being finished by a workman shows signs of fine fiberglass fabrication. Stock or hopped-up components slip in.

This might be considered the first Devin sporting vehicle. Starting drill was simple if of the run-and-bump variety, remembering to pull up on a long wire connected to the Model T carburetor. This device invariably lit up after a short time and had to be wrestled to earth and a rag stuffed into the intake. Another shadow of the future was one of the world's earliest karts built for younger brother Gene out of a bunch of junk, tin tire signs, and a washing machine motor. Chassis design in Rocky at that time being in its infancy, this bolide went pretty well down their street to the cheers of neighboring urchins but betrayed colossal understeer when asked to take a turn up into the driveway to the detriment of Gene, the racer, and a large oak tree which happened to be occupying that particular corner.

Oklahoma blew away, business blew away, and in 1939

the Devins followed a classic pattern and came to Southern California. There Bill worked "around cars" and at Douglas Aircraft in flight operation before joining the Navy in 1942 as a Machinist's Mate, being sprung 31 long months later. Returning to California, he began doing tuneup work on commission for a Chevrolet dealer and eventually scratched together enough to think about starting his own agency. Los Angeles being too crowded and expensive at that time, he betook himself back to Montour, Iowa, a nice little market town on Route 30 which offered lower expenses, less competition, perhaps a less sophisticated clientele, and needed his talents whether it knew it or not. There he speedily found an old Ford plant and handled Chrysler-Plymouth, farm equipment, Firestone tires and schlock plus that poor man's Bugatti, the Crosley. Reading between the lines, I gather that the Devins were forced to hop up the latter . . . or at least the demonstrator . . . to assist sales but at any rate the business prospered and in 1949 it was going well enough to be sold at a good profit as the family, tired of the rigors of the *mittel-amerikan* climate, returned to California. Another Chrysler-Plymouth agency was picked up out in Fontana and another Crosley Hotshot was acquired as being the logical car for Los Angeles.

The first stirrings of the sports car movement were commencing and Bill and brother Gene went to see the first Santa Ana road race (as did I), all of us catching the fever. Pebble Beach, of sainted memory, came to pass and the Crosley was duly entered to be driven by Gene, sharing with another Hotshot the honor of starting a tradition of Crosley participation in this classic event. Alas, the clutch pedal rod fell out, as it does on this make, but the disease had set in and thereafter races came thick and fast, the most successful, perhaps, being the Buchanan Field event where their Hotshot, aided by a local ground rule that required the larger cars to pit halfway through for tires, finished fifth behind Jack McAfee (Jaguar), Jim Seely (Cannon Special), Bill Stroppe (MG V8-60), and Joe Esherick (BMW 328). Figuring that he was ready for the big leagues, Bill then cast his eye on the then-new and promising Allards as a receptacle for the potent Chrysler V8 but at that time, according to Bill, his suppliers allowed as how they weren't interested in hot rods.

The car business was pretty fierce at that time and eventually Devin got tired of having to eat new Chryslers and sold his agency, working a deal with the late Ernie McAfee to bring in and sell Siata V8s and Ferraris, the latter including the ex-Cunningham, ex-Guiberson 2.6 Vignale coupe that Phil Hill drove in Mexico, a 4.1 Vignale coupe that Masten Gregory bought, promptly running its gearbox dry, and one of the classic two-liter Touring V12s.

The partners went to Italy and looked in on the factories, even supposing to have a three-liter Farina coupe for Le Mans (which wasn't ready after they had bought it, unfortunately) and Bill was working out a deal with Scaglietti about converting old F.2 cars to sports when the spaghetti curtain was snapped down by person or persons unknown. Whether this had any connection with the four-cylinder Mondial and Monza Ferraris appearing soon afterwards or if they had already been designed and someone thought that the Devin hybrids might hurt (*Continued on page 75*)

Brother Gene, with glasses, works on the aft section of the Roosevelt Abarth. The front half is in the foreground of this scene straight from Maranello.

With a new look, new power and new gearing, the Sprite has come of age. It's more expensive than before but it's more fun and more automobile too.

AUSTIN-HEALEY SPRITE II

► There's a new Sprite in town! May 31st is the official introduction date for a face-lifted, repowered Mark II edition of the world's best-loved sports car. It's a grown-up car with a grown-up price, and as such we believe it's the first move in a BMC plan to upgrade its whole series of sports cars and introduce a new, cheaper MG Midget (SCI, June, 1960) at the bottom of the ladder.

In basic frame design, suspension, handling and braking, the Sprite II is identical to the car we Road-Researched in C/D of last April. This Road Test will thus deal only with the changes.

The whole front end has been restyled in a much more conventional idiom that certainly makes the Sprite look more like an automobile. It's still based on the old sheet metal distribution, as you can see from the retention of the old hood parting lines along the sides. The new hood is ordinary alligator-type with a single central latch in front and a very long supporting stay on the left side. The hood latch control is a knob under the dash lettered with a large "B", for "bonnet." Unless you miss the ready access to the front suspension, you'll find the new hood opening doesn't significantly affect service ease. The fuel pump is one of the few engine accessories that's nearly vanished behind the sheet metal curtain.

More rugged in design, the front bumper is also more solidly braced to the platform frame by virtue of being placed closer to it. A reduction in front overhang has made possible a lengthening of the rear, and an increase in luggage capacity, while actually reducing overall length. (C/D's RRR figure was accidentally two feet short, should have read 137.3 inches for the original Sprite.)

Revolutionary is the inclusion of an external trunk lid with a lockable latch, worked by a different key than the ignition. It opens onto a remarkably roomy (technically 11½ cubic feet) compartment with the spare lying flat on the floor. There's a new bulkhead separating the cockpit from the trunk, and to this is strapped a big padded case that holds the collapsed top bows and prevents them from rattling.

On the cockpit side, the new bulkhead forms the back of a carpet-trimmed compartment that's opened up at the top by cutting back the rear edge of the cockpit. This new volume is tremendously useful for extra baggage, temporary stowage of packages or cameras, or even laterally-installed children. When the top's up it's a handy integral part of the interior. When the top's down it can be kept available by leaving off the tonneau cover, and when the cover is installed it's kept firm right up to the seat backs by a two-piece bow that's inserted in the top sockets. On our test car the two bow pieces wouldn't readily telescope together; sawing a slot in the female piece solved that.

Basically the interior is unchanged but the dashboard controls have been rearranged. Gone is the headlight knob around the ignition, replaced by a three-position toggle

New carpeted compartment behind the front seats is very handy with the top up, as here. Design of top and side curtains has not been changed.

New hood arrangement is wide, light and easy. Engine changes include use of larger Coopers air cleaners in place of original wire-mesh type.

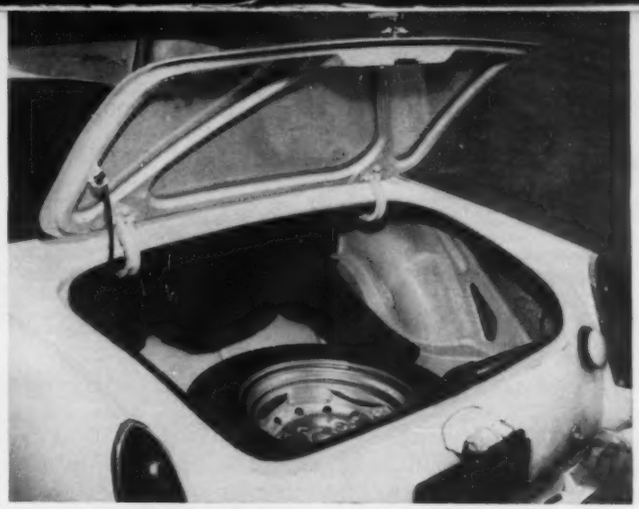
switch. A matching toggle now controls the windshield wipers. Heater and windshield control knobs were moved up to the top row, where the choke and starter pulls have swapped positions. A clockwise twist of the choke now locks it in any position. A subtle change is the use of a horn that's still the same raffish razzberry but with a richer, deeper tone. Its voice is changing too!

The Sprite II's BMC A-Series engine has been pepped up in many areas, using up several stages in the tuning manual. Flat instead of cupped-crown pistons increase the compression ratio to the point where we tentatively recommend Premium instead of Regular gas for best performance. Better breathing accrues from a new cam with more generous timing, valves enlarged in diameter by 1/16 inch, a smoother exhaust manifold and the use of 1¼-inch instead of 1⅛-inch twin S.U. carburetors. As-installed power is now 46.5 bhp against 43 before; our SAE figure of 52 bhp is estimated. Peak power speed is up to 5500 from 5200 rpm, and though peak torque is practically the same as before, it now comes in much lower at 2750 instead of 3300 rpm. The new engine is strong and smooth through its whole range, being if anything more tractable at low speeds than its predecessor.

New power is mated to new gearing. The figures given indicate it's virtually the same gearbox as the close-ratio unit described in our Sprite RRR, and it's a honey. With just a little more power available to pull them, the new higher indirect cogs are beautifully spaced. In particular second gear, which was all through at 39 mph before, now soars enthusiastically to 48. None of our readers will mind that the Sprite no longer starts easily from rest in second!

Performance is not significantly better than that of the old Sprite, but the acceleration curve is a little steeper up to 50 mph and the quarter-mile time is cut by 0.6 second. Since frontal area is unchanged, top speed is increased by 5 mph. Early BMC releases stated that brake shoe width had been increased from 1¼ to 1¾ inches, to match the higher speed, but a check of our test car's binders showed that no change had been made. Thus this was either a typo or a last-minute technical decision.

In style, roominess and performance the Sprite II today is everything the MG TD was ten years ago. It does it on much less gas and, even without accounting for the shrinkage of the dollar, it costs less to buy. Thanks very much, BMC, for a tremendously enjoyable car, and for an improved Sprite that really is improved. —*C/D*



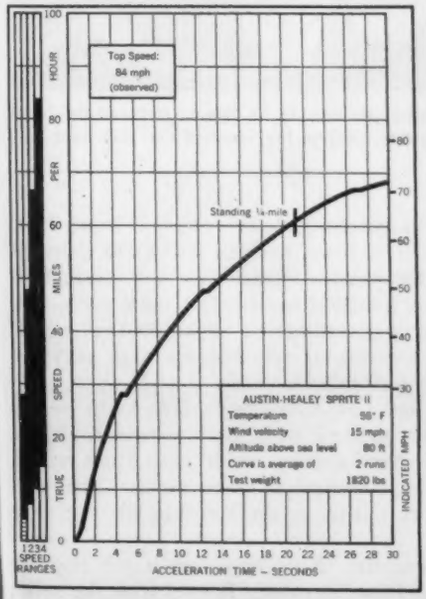
Short strut on left supports the new lockable trunk lid. The tool kit, with the jack, is strapped to the forward wall with top bow container.

ROAD TEST:

AUSTIN-HEALEY SPRITE II

Price as tested: $1995

Importer: Hambro Automotive Corp.
27 West 57th Street
New York 19, N.Y.


Top Speed:
84 mph
(observed)
Standing ¼-mile
AUSTIN-HEALEY SPRITE II
Temperature 98° F
Wind velocity 15 mph
Altitude above sea level 80 ft
Curve is average of 2 runs
Test weight 1820 lbs
TRUE MILES PER HOUR
INDICATED MPH
1 2 3 4 SPEED RANGES
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
ACCELERATION TIME – SECONDS

ENGINE: (BMC A-Series)

Displacement	57.9 cu in, 948 cc
Dimensions	Four cyl, 2.48 in bore, 3.00 in stroke
Valve gear	pushrod-operated vertical overhead valves
Compression ratio	9.0 to one
Power (SAE)	52 bhp @ 5500 rpm
Torque	52.5 lb-ft @ 2750 rpm
Usable range of engine speeds	900-6000 rpm
Corrected piston speed @ 5500 rpm	2500 fpm
Fuel recommended	Premium
Mileage	30-33 mpg
Range on 7.2 gallon tank	215-235 miles

CHASSIS:

Wheelbase	80.0 in
Tread	F 45.8, R 44.8 in
Length	136 in
Ground clearance	5.0 in
Suspension: F, ind., coil spring, wishbone and control arm; R, rigid axle, trailing quarter-elliptic leaf springs and control arm.	
Turns, lock to lock	2 1/3
Turning circle diameter between curbs	30½ ft
Tire and rim size	5.20 x 13, 15 x 4J
Pressures recommended	F, 18, R 20 psi
Brakes; type, swept area	7 in drums, 110 sq in
Curb weight (full tank)	1500 lbs
Percentage on driving wheels	49%

DRIVE TRAIN: (BMC A-Series)

Gear	Synchro?	Ratio	Step	Overall	Mph per 1000 rpm
Rev	No	4.12		17.40	—3.7
1st	No	3.20	67%	13.51	4.8
2nd	Yes	1.92	39%	8.08	8.1
3rd	Yes	1.38	38%	5.80	11.2
4th	Yes	1.00		4.22	15.4

Final drive ratios: 4.22 to one standard; 3.73, 4.55 and 5.38 to one optional.

Disc brakes now make Carlo's latest a more than suitable slingshot for upcoming David and Goliath contests in G.T. racing both in Europe and the U.S.

FIAT ABARTH 1000

► Last season, the Fiat Abarth 750 twin-cam was merely startling as it repeatedly drove into the winner's circle against competition twice its size. The awe with which SCCA regards Abarth can be divined from its classification of the new one-liter with some proven competition machinery of from two to 3.8 liters. If justified, this could clinch a rating of astounding for the new car. After testing the new car, we believe it *is* justified. On paper or pavements, it belongs there, extraordinary as that seems. Whether race results will show it can out-maneuver the bullies is going to depend, more than for most cars, on the course, the driver and the state of tune.

In sampling the latest high-class Carlo Abarth hot rod with the hospitality of the DFL Abarth Company, we took advantage of the driving talents of Brooks Robinson and the first American owner, George Owen. Two cars were involved in the testing, Owen's and DFL's tryout car for selecting drivers for Sebring.

To describe the performance of this car without abusing the familiar superlatives brings tears of frustration and numb fumbling for the thesaurus. We fall back on quotation, for a comment made by an experienced competition driver who prefers to remain anonymous as he handles a rival make. Staggering out at curb level after a run on our closed circuit test site, he said, "Dam'dest going car for one liter I've ever driven. It's ridiculous, but it's likely to be a class winner!"

In appearance, the Fiat Abarth 1000 Record Monza Bialbero is nearly indistinguishable from its smaller-engined ancestor. Even the name is hardly changed. The same Zagato coupe body rests on the same wheelbase (78.8 inches) and has the same height (45 inches) and width (53 inches). (See *SCI* for Sept., 1959) The body has been stretched just a bit in the nose and in the tail, to bring it out to 141 inches (stock without bumpers) against the 750's 137 inches (stock with bumpers). An important change is in the use of one-inch-larger 13-inch-diameter steel disc wheels.

Inside, the big, bold, cowled instruments stare back at you with a hearty "Let's go racing!" glint. The minor switches and indicator lights in the center of the panel have been stirred around a bit. The oil temperature gauge has jumped from the far right to far left, making it easier for the driver to see. The traditional Fiat pull-up starter is gone; now you twist the key (as on the Fiat 600D). The competition seats mean an improvement in headroom for long-torsoed drivers due to their distinct "lay-back" design. Angled side members give outstanding lateral support.

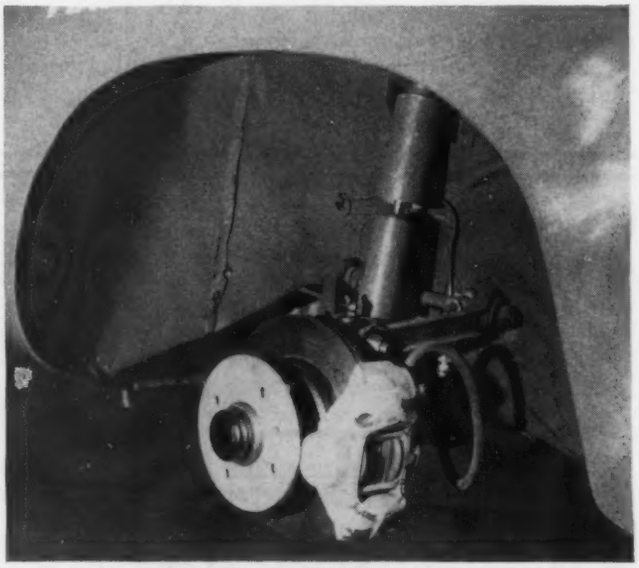
For the short-legged driver to achieve the "arms-out" position, spacer blocks on the clutch and brake are almost essential. The arms-out position, in turn, is dictated by the lack of elbow room. The steering column is offset to the right of the seat centerline but perhaps the seat could be angled slightly toward the center to gain some room for the left elbow.

The space behind the seat will accommodate one emaciated English sheepdog or a fair bit of odd-sized luggage. For compelling evidence that Signor Abarth does not envision his creation as transportation for boy and girl on an idyllic weekend, there is, just behind the doors and across the ceiling, a factory-installed roll bar of truly stunning proportions.

Generally, the interior is just a notch above stark. Nothing uncomfortable or incomplete about it, mind you, as it even has a map light. But it is clearly designed as a working man's cockpit and the work proposed is to go terribly fast.

Up front, the trunk is a thoroughly well-filled receptacle for the spare tire and a hefty 11.9-gallon gasoline tank, good for a 310-mile cruising range.

In back, ah! in back . . . A pull on the hood handle reveals a stunning pile of Abarth dedication and ministration to the Fiat 600D engine. This new unit, 767 cc in production form, gives Abarth the springboard for his jump from the previous 750 cc to a full liter. While Abarth keeps Fiat's iron block, he goes way out on his own after that. The new casting has room for boring to 65 mm and a massive Abarth crankshaft of 74 mm stroke, for a displacement of 982 cc. Connecting rods, pistons, bearings and minor machining on the block are all provided by Abarth. On top rests the twin-cam alloy head, essentially identical to the 750's and entirely Abarth's. The 10.2 to one compression ratio is considerably higher than tried previously. The distributor has been moved from the right side to an accessible position at the left rear. Two massive twin-throat Weber 36 DCL4 carburetors rest at an angle on special manifolds over this small but complex stack of Italian metalwork. With the optional 40 DCM2 Webers, compression ratio is raised to 10.8 to one.



The faster you go, the faster you want to be able to stop and the latest Fiat Abarths mate Girling disc units to the standard Fiat 600 front end.

The unit chassis is unchanged as received from Fiat. Springs (transverse leaf in front, coils in back) are changed to suit a car almost 400 pounds lighter than the production sedan and to meet competition needs. But the basic geometry is retained, a startling testimonial to the 600D of which Fiat is well aware. Steering is speeded up over previous Abarths with 2.8 turns lock to lock.

The 750 Bialbero had one fault, its brakes. With nearly double the horsepower to cope with, they were still almost stock Fiat 600 items. Now shining inside each front wheel are Girling disc brakes, identical to those on the Triumph TR-3. Another factory option is similar discs for the rear wheels.

That's how it is physically. Now, how does it go? It goes, frankly, just as if it had lost its mind. It goes with the solid united feel of a cohesive design (*Continued on page 68*)

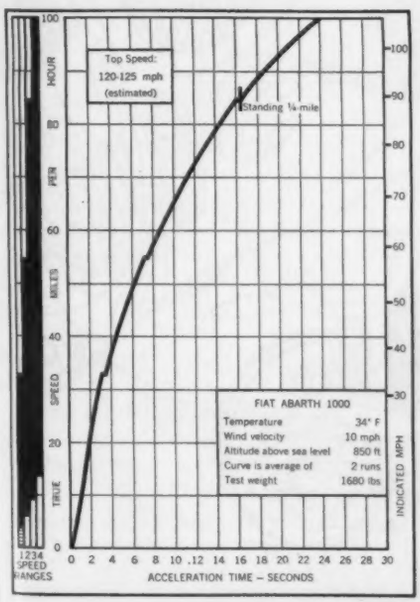
SCHULKE

ROAD TEST:

FIAT-ABARTH 1000

Price as tested: $5995 delivered in Chicago

Importer: DFL Company
110 South Dearborn St.
Chicago 3, Illinois


Top Speed:
120-125 mph
(estimated)
Standing ¼-mile
FIAT ABARTH 1000
Temperature 34° F
Wind velocity 10 mph
Altitude above sea level 850 ft
Curve is average of 2 runs
Test weight 1680 lbs
TRUE MILES PER HOUR
INDICATED MPH
1234 SPEED RANGES
ACCELERATION TIME – SECONDS
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
0 20 40 60 80 100

ENGINE: (based upon Fiat 600D cylinder block)

Displacement	60.5 cu in, 982 cc
Dimensions	Four cyl, 2.56 in bore, 2.91 in stroke
Valve gear	Chain driven double overhead camshafts, valves at 80° included angle, 136° overlap
Compression ratio	10.2 to one (10.8 optional)
Power (CUNA)	91 bhp @ 7100 rpm
Torque	77 lb-ft @ 5500 rpm
Usable range of engine speeds	800-7500 rpm
Corrected piston speed @ 7100 rpm	3230 fpm
Fuel recommended	Premium
Mileage	26 mpg
Range on 11.9-gallon tank	310 miles

CHASSIS:

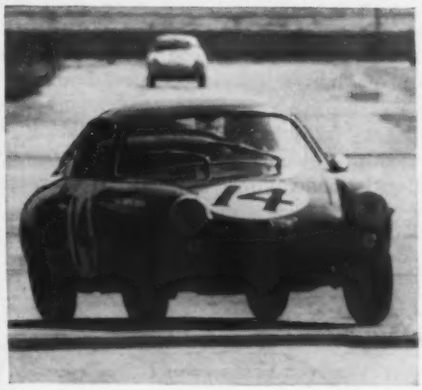
Wheelbase	78.7 in
Tread	F 45.2, R 45.6 in
Length	141.0 in
Ground clearance	5.5 in
Suspension:	F, ind., transverse leaf spring, upper wishbone; R, ind., coil, swept wishbone, swing axle.
Turns, lock to lock	2.8
Turning circle diameter between curbs	28½ ft
Tire and rim size	135 x 330 (both)
Tire pressures	F 25, R 29 psi (street) F 32, R 34 psi (racing)
Brakes; type, swept area:	F 9½ in disc, R 7.3 in drum; 263 sq in.
Curb weight (full tank—based on mfgr's figures)	1350 lbs
Percentage on driving wheels	60%

DRIVE TRAIN:

Gear	Synchro?	Ratio	Step	Overall	Mph per 1000 rpm
Rev	No	4.28		18.51	—3.5
1st	No	3.38	64%	14.67	4.4
2nd	Yes	2.06	54%	8.90	7.3
3rd	Yes	1.33	49%	5.78	11.3
4th	Yes	0.896		3.88	16.8

Optional gears: 2nd—1.75; 3rd—1.20; 4th 0.965, 0.866, 0.833.

Final Drive Ratios: 4.33 to one std., 4.88, 5.13, 5.38 optional.



Turning back the clock at the Le Mans 24 Hours, Robert Straub sketches some of the winners and losers that have made the unique event famous.

Immortal Le Mans Machines

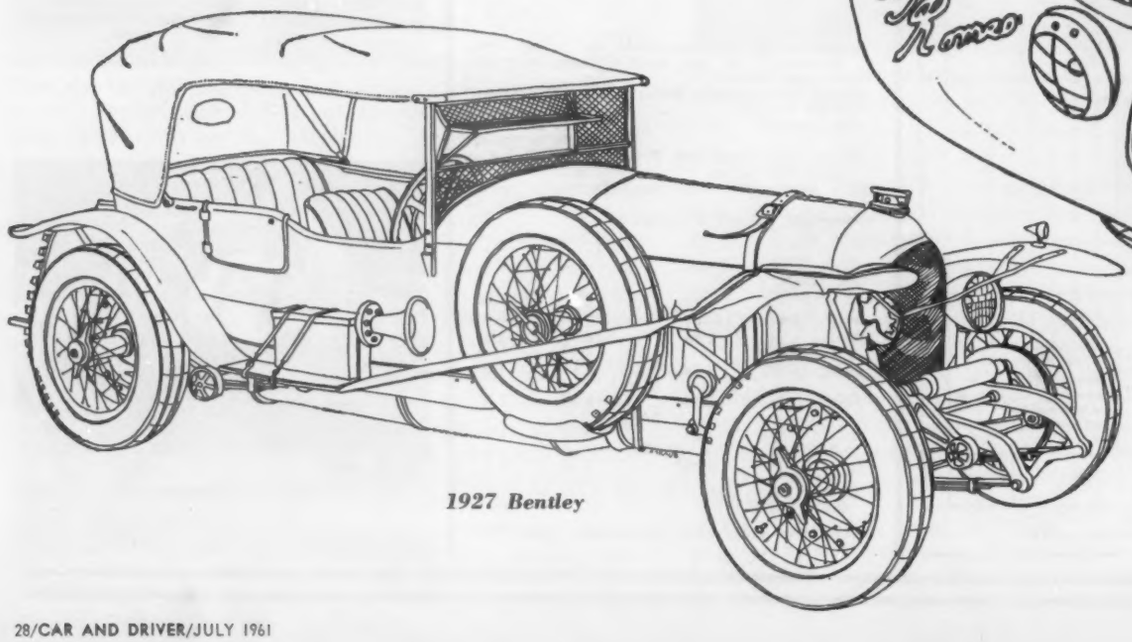
► Perhaps the most exciting assemblage of racing cars is that group which gathers annually on the longest day of the year in a small French town. The 24-hour race at Le Mans has always attracted the weirdest, wildest and fastest machinery going. The contemporary cars uphold that tradition but the pace was set in the early days by the cars sketched here.

Some of the cars have vanished from the production scene. Others have evolved into sedate, expensive personal cars. But none of them has been forgotten by enthusiasts for they helped forge Le Mans into the prime race in the world.

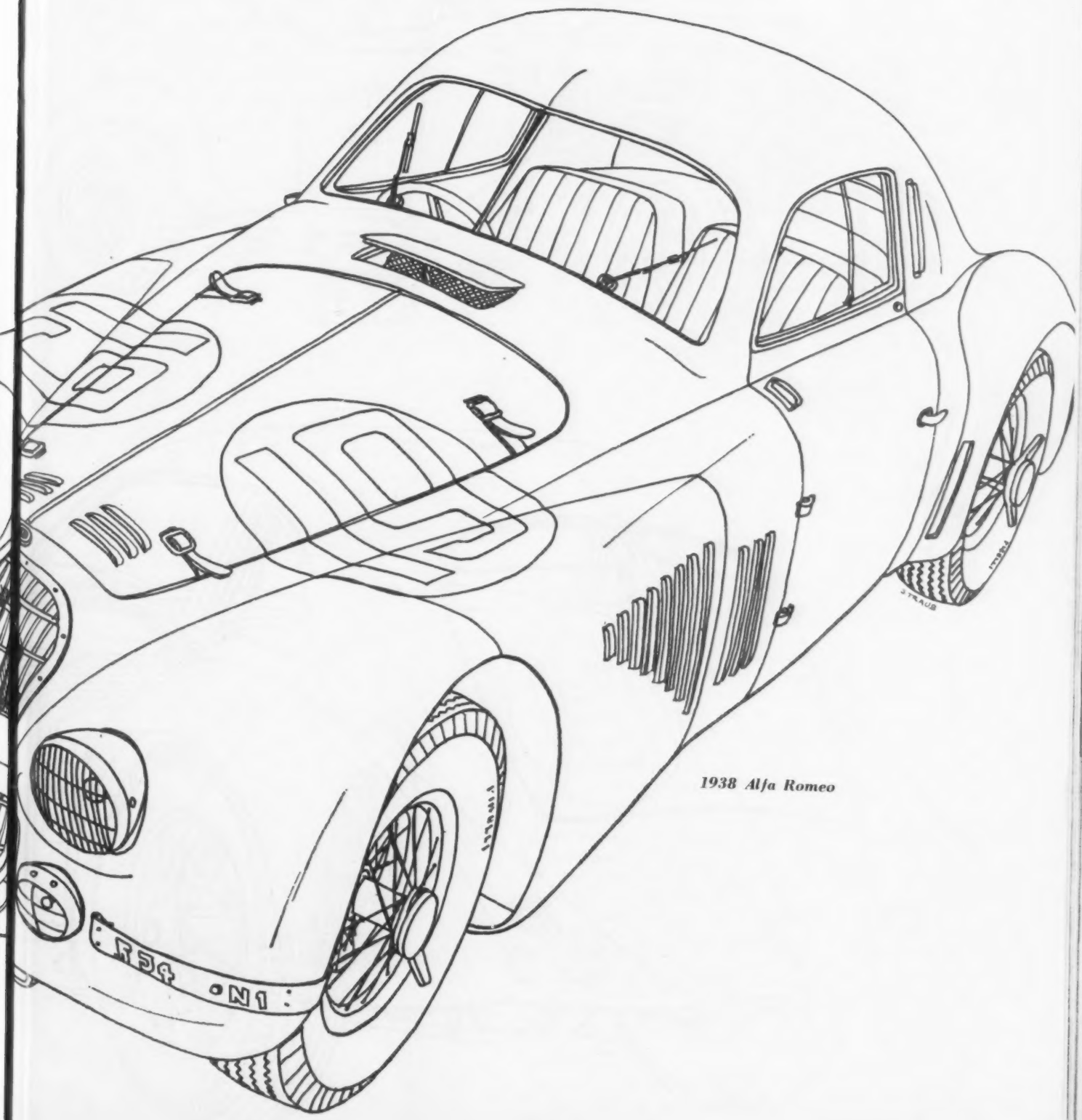
The Bentley, battered after its historic crash, went on to win in 1927 through the skillful driving of S.C.H. Davis and Dr. J. D. Benjafield. No. 3, a three-liter four-cylinder tourer had a fabric-paneled body by Vanden Plas and earned sixth overall in 1926 wearing number 7. The 1927 victory launched Bentley domination of the Sarthe circuit, a coup that consisted of wins in 1927, 1928, 1929 and 1930. Bentley had won earlier, in 1924, setting a record of five victories matched only by one other make—Jaguar. The 3-liter Bentleys were all stock tourers and Dr. Benjafield used one regularly making his rounds.

Among early American entries were Chryslers that raced in 1928 and 1929. They were essentially stock six cylinder roadsters, just over four liters. The fenders were bobbed slightly from stock form. In 1929, the year of the big Bentley sweep, Chryslers of Steel and Benoist and De Vere and Mongin took sixth and seventh overall behind four Bentleys and a supercharged Stutz. Stoffel had been in fourth, but was slowed down by fuel line trouble.

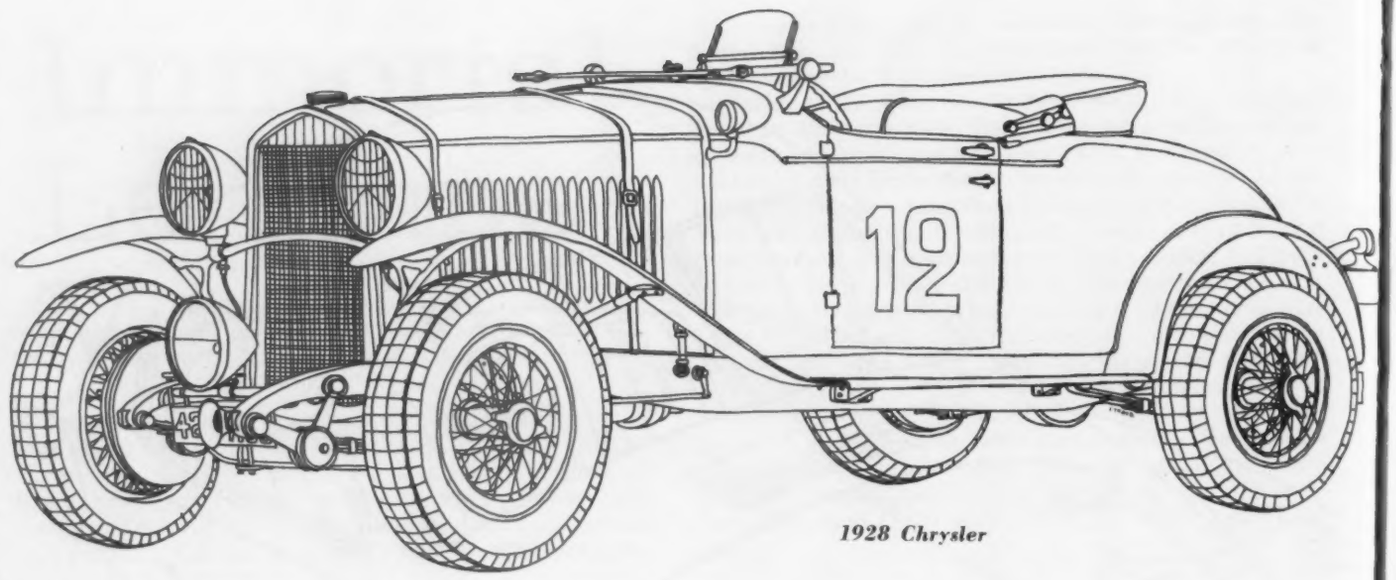
Front-wheel drive has been used by a number of entries at Le Mans and one of the more interesting types was the Tracta. A French entry, three Tractas placed 12th, 16th and 17th overall in 1928 — each with a different type of powerplant. One was a four-stroke engine, two were two-stroke and none had the same displacement. The highest-placed car, driven by Benoist, had a 1099 cc engine, while No. 29, driven by Gregoire, had 1481 cc and ran the slowest race. Compared to the giants of '28, (*Continued overleaf*)



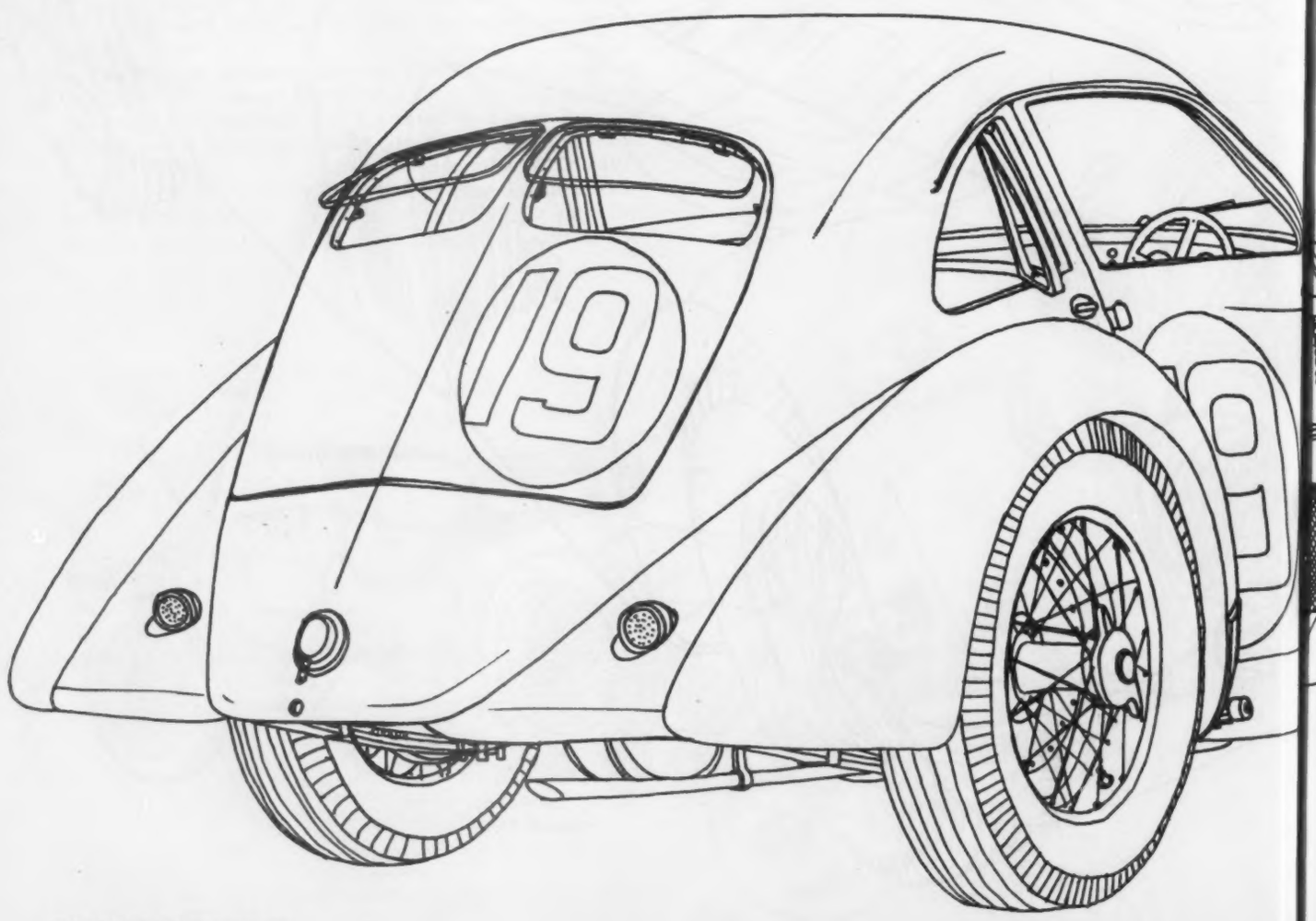
1927 Bentley

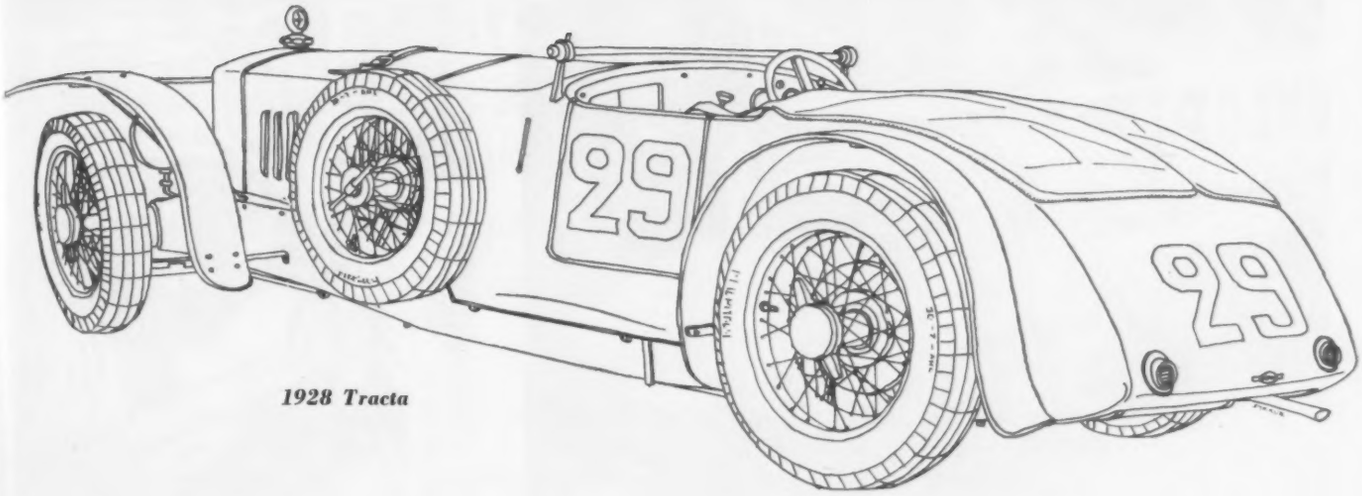


1938 Alfa Romeo

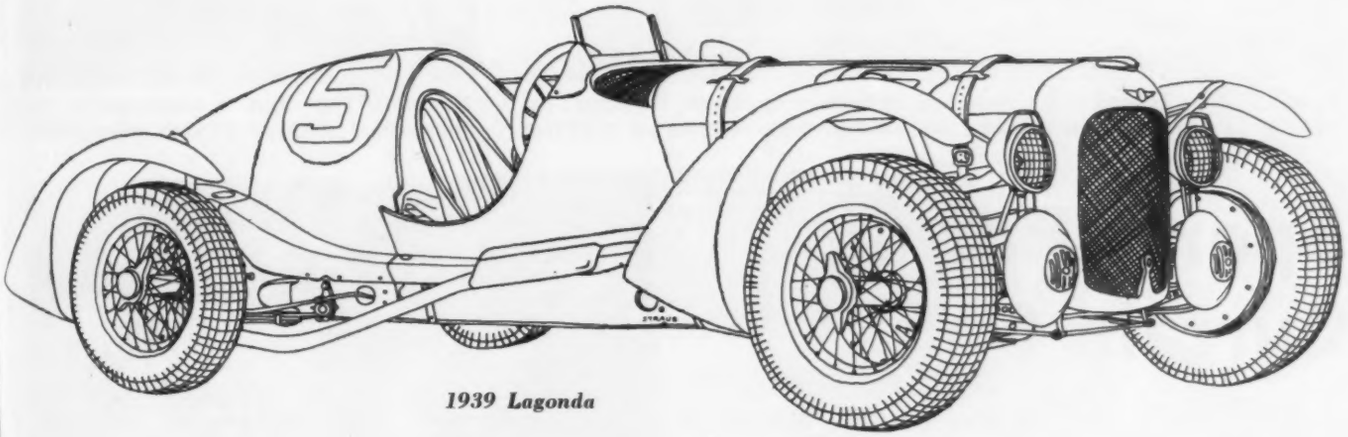


1928 Chrysler

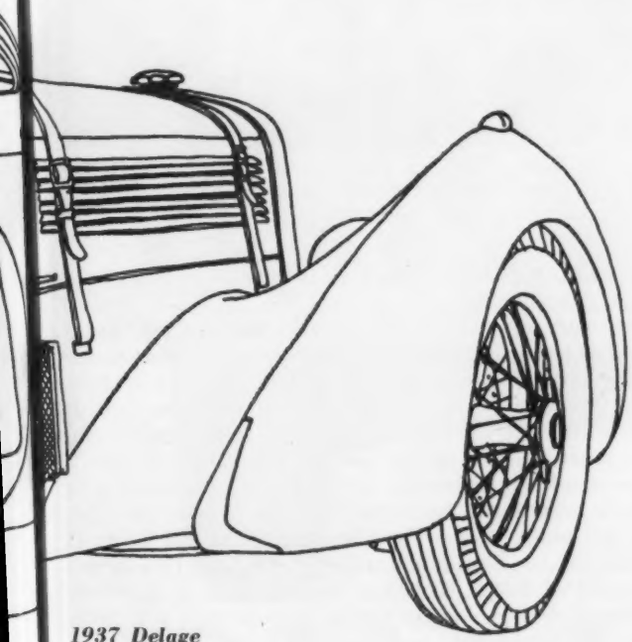




1928 Tracta



1939 Lagonda



1937 Delage

the Tractas were very low and squat. The next year they did better, winning 9th and 10th overall.

The 220 bhp V12 Lagonda, while totally different in concept, shows a kinship to the earlier Bentley, being designed also by W. O. Bentley. In '39, the Lagonda of Dobson and Brackenbury finished third, averaging 83.61 mph behind a Bugatti and a Delage. The unusual fairings under the headlights, flanking the radiator shell, contained the horns and ducted cooling air to the brakes. Unusual too was the asymmetric body contour ending in a streamlined tail just behind the driver.

Streamlining set the key for the Delage coupe driven by De Valence and Gerard in 1937. Based on a D6-70 chassis, it had a 2729 cc displacement. Gerard did well with Delages in the immediate pre-war period but in '37 he had to be content with fourth overall at Le Mans, averaging 75.2.

The genesis of the Italian design school may be seen in the 2.9 Alfa of 1938, driven by Sommer and Biondetti. It represents the traditional stage from the body and fender layout to the full envelope shell. The supercharged eight-cylinder coupe turned the fastest lap at 96.178 mph, and was in the lead for 21 of the 24 hours. Just as Sommer had victory in sight a tire blew, tearing up a fender, and the car had to come into the pits. Biondetti took over, but two laps later the car was retired. —*RS*

Porsche is pinning its hopes on this special hard top sports-racing machine. The factory's own prototype disc brakes were tried in practice. High pad wear may prevent their use in the race.

Team driver Edgar Barth is encapsulated in the neatly-trimmed cockpit of Porsche's racing coupe.

Sports-Racing Curtain Call at Le Mans

by Jesse Alexander

1962 will see the 24-hour race contested by G.T. machines only. Practice then for '61 represents one of the final appearances of the all-out racers.

Lines of new racing Porsche are clearly derived from those of Abarth's Carrera coupe. Heavy-duty wipers clear the sharply raked windshield.

► Held in 1961 for the third year, the April Le Mans trials attracted more participation than ever before and factory representatives from eight different makes were on hand. Enzo Ferrari has said several times that Le Mans is the most important race in the world and he is out to repeat his past victories on the Sarthe circuit. There will be no less than ten Ferraris in the '61 race. Three were transported to Le Mans for practice: the new rear-engined 2.5-liter V6 (see page 60), a front-engined 3-liter V12 with all-round independent suspension, and a G.T. Berlinetta.

The latter car surprised everybody with its fantastic speed and G.T.-ace Tavano turned a fast 4:10 lap as did the up-and-coming Englishman, Michael Parkes. In an effort to equal these times, the Belgian Schlesser crashed the G.T. in a big way just over the top of the hill leading down to the Esses. Schlesser escaped with several broken limbs but the car was totally demolished. The Berlinetta times were almost ten seconds faster than those of last year. With just a little bit of luck, there is absolutely no reason why the Modena firm can't pocket this race as well as Sebring. It is reported in a French paper that Stirling Moss will be driving a N.A.R.T. Ferrari at Le Mans in June.

Chassis and engine problems are virtually nil with Ferrari and at the moment all they have to solve are annoying things like preventing exhaust fumes from entering the cockpit, and somehow improving the driver's vision in the rain. It rained briefly but heavily during the practice session and Ferrari tester Ginther pulled into the pits reporting that it was just absolutely impossible to see either through or over the plastic windshield. Both Phil Hill and Ginther set a hot 3:54.8 (127 mph) time in the rear-engined car and Trips set 3:54.6 on Sunday, both substantially under Mike Hawthorn's 1957 record of 3:58.7. This was the highlight of the week-end. Ferrari driver placings for the 24-hour race will probably be Hill/Gendebien and Ginther/Trips, with Mairesse and an Italian sharing a third car. But the G.T. Berlinettas are fast and the sports car drivers will have their hands full staying ahead of them in the 24 hours.

Ferrari personnel were casting envious eyes toward the

(Continued on page 35)

A car almost impossible to criticize.

These are the words *Road & Track* uses to describe the new Peugeot 404. The magazine states that the 404 is "one of the best handling, most roadworthy compact sedans on the market." *Sports Cars Illustrated* (now *Car and Driver*) predicts that the Peugeot 404's body styling "will undoubtedly become a classic in the years to come." "Happy American owners" according to *Motor Trend* "will testify that the 403 is one of the world's most solid and dependable automobiles. They are soon to be joined by a good-size crowd who will be drawn naturally to the 404." Won't you join them at your nearby dealer's showroom soon? There are over 500 conveniently located Peugeot dealers throughout the United States, Mexico and Canada.

$2575
Suggested fully-equipped price
East and Gulf Coast P. O. E.

PEUGEOT

PRONOUNCED "POOJ-OH"

For dealer list and brochure, write: Peugeot, Inc., 750 Third Ave., New York 17, N. Y. For overseas delivery see your dealer or write: Peugeot, Box 158, Long Island City, New York.

©1961 VOLKSWAGEN OF AMERICA, INC.

We also make a funny-looking car.

We make a car that looks like a beetle.

And a station wagon that looks like a bus. (Or so we're told.)

But we think of them a little differently; both Volkswagens look just like what they are.

The VW Sedan is for carrying 4 people. The station wagon is for carrying 8, bag and baggage. (With almost as much headroom and legroom as you get in a real bus.)

The wagon also handles a staggering amount of just stuff. (It has 170 cubic feet of space, compared to about 105 in conventional wagons.)

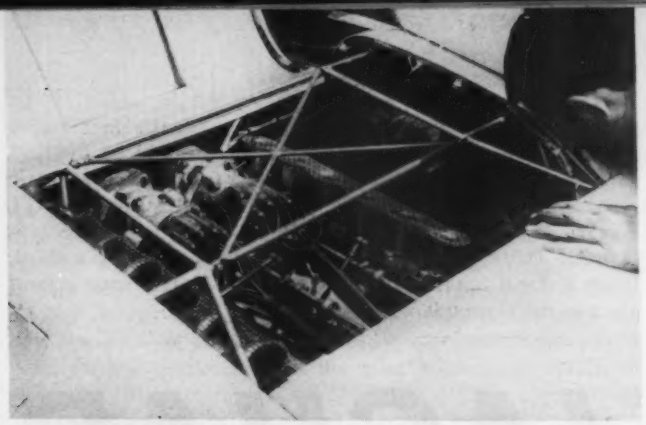
Both Volkswagens have air-cooled rear engines. No water or anti-freeze needed; terrific traction on ice and snow.

Both park in practically the same space. (The wagon is only 9 inches longer.)

Both defy obsolescence. Nobody knows what year VW you drive. Except you.

Our sedan is a pretty familiar sight; not many people laugh at it any more. But our station wagon is still good for a few chuckles.

Cunningham's Type 63 Maserati tried Dunlop disc wheels, as here, at the practice session. Behind it is the prototype with V12 engine in back.



Gear extensions from camshaft drive allow high placement for the V12's twin distributors. Maser is also preparing a new V8 engine for Le Mans.

Carlo Abarth's new racer, with twin-cam engine ahead of the rear wheels, looks practical and aerodynamic but no prettier than the Type 63 Maser.

special closed Porsche Spyder, designed expressly for Le Mans. This beautifully executed "hard top" racer is certainly the ideal solution for a race such as Le Mans where prevention of driver fatigue is all-important. Barth and Linge, who were testing the car, reported complete comfort — no vibration, very little noise, and most of all no buffeting wind which really tires a driver over a long period. This Le Mans Porsche turned a comfortable 4:21 lap on a slightly wet track, not markedly faster than last year in comparison to the much faster Ferrari times. Porsche's own disc brakes were tried out in the morning and in the afternoon drums were put back on. Barth expressed a preference for the discs but their higher wear (life: about 30 laps) may convince them that the drums would be a safer bet for 24 hours.

With Jaguar unable to supply him with a homologated E-Type for Le Mans, Briggs Cunningham has turned to Maserati for a car. His chief engineer, Alfred Momo, suggested to Alfieri of Maserati that they put a twelve-cylinder engine into the Birdcage frame in the hope that its smoother characteristics might be conducive to longer life. So between Sebring and Le Mans practice, a space of just two weeks, a new 3-liter V12 was squeezed into the old prototype Type 63 frame. This 330 bhp engine is a derivation of the earlier 2.5-liter F.1 power unit, and had been tested extensively for sports car use in 1958. Weber downdraft carbs are fitted between the camshaft banks and spark plugs (two per cylinder) are charged through a hole in the side of the rear part of the car. Also being tried out at Le Mans on the Maserati were light-alloy disc wheels, both from Dunlop and Amadori.

The noise of the twelve-cylinder Birdcage was more shattering than its initial performance. Scarlatti went out in it but the car never did approach the Ferrari times and oil pressure trouble sidelined it by the close of the first day. Another Birdcage had its magnesium rear-wheel carrier fracture while Hansgen was at the wheel, accelerating full-bore toward Indianapolis corner. Walt was lucky to escape unscathed.

Carlo Abarth was personally directing the trials of his Le Mans entries, the most interesting of which was an independently sprung open two-seater with a special space frame, powered by the 982 cc *bialbero* engine, turned around in the chassis. Abarth will have four cars at Le Mans this year.

Scuderia Serenissima, backed by money from Italy's Count Volpi, plans a full year's racing and will have at least one Type 63 Maserati at Le Mans. Ecurie Ecosse has entered a Cooper Monaco powered by a 2.5-liter Climax engine. Also participating in the training session was Triumph with two of its special TR3-S cars, a special Sunbeam Alpine, a pair of Lotus Elites, and the usual group of blue-painted D.B.s.

In lieu of factory Aston Martin participation, there will be two privately-entered DB4-GTs at Le Mans this year, one of them a Zagato-bodied car. In training it was far from being a threat to the Ferrari, and lapped at relatively slow speeds.

This year's Le Mans will undoubtedly be the last one catering to sports cars, as G.T. racing is expected to come into full swing in 1962. Feelings about this are mixed over here, with many people sorry to see the spectacle of sports car racing go. Regardless of how impractical or unrealistic they may be, the full-blooded sports-racers are tremendously exciting cars. But then the G.T. machines will be too, before very many years of racing! *—JLA*

► On April 15 the Jaguar E-Type made its first racing appearance, at Oulton Park in England. Straight off the line, in completely standard trim, two soft-top models took on such established Grand Touring contenders as 250/GT Ferraris and DB4-GT Aston Martins. At the end of 25 laps Graham Hill's Jaguar was first and Roy Salvadori's third, Innes Ireland having slipped his Aston Martin into second place in the closing laps.

JAGUAR XKE WINS FIRST RACE!

David Phipps describes the rocketing performance of the roadster that trounced a 250/GT Ferrari and DB4-GT Aston Martin in its initial competition outing.

THE AUTOCAR, LONDON

Roy Salvadori leads eventual winner Graham Hill at Oulton Park during first competition outing for Jaguar's new XKE roadster. Roy placed his E-Type third after Innes Ireland's Aston Martin. Hill gives his pit the OK sign (at right) during his successful drive for non-factory team.

The background story to the race is extremely interesting, and does Jaguar great credit. Earlier in the week the Equipe Endeavour car, which Graham Hill drove, had been tested at Silverstone together with the Equipe Endeavour G.T. Ferrari. The Ferrari was slightly faster; nevertheless the decision was made to race the Jaguar and hope that its independent rear suspension would pay dividends on the twisty Oulton Park circuit.

For Jaguar the whole project was a big gamble. They sold cars to Equipe Endeavour and John Coombs knowing they would be raced – and knowing that the car's prestige depended on the efforts of private owners. At the end of practice the odds lengthened, with Innes Ireland in the Aston fastest, Jack Sears second in the Ferrari and the Jaguars third and fourth. But when the flag fell the Jaguars, with their independent rear ends and Powr-Lok differentials, roared into the lead, Salvadori initially ahead of Hill. There were never more than a few yards between them, and eventually Hill managed to snatch first place at the end of the main straight – where the circuit is flanked by a lake – and pull away to win by 5.6 seconds from Ireland, with Salvadori a further 4.2 seconds behind and the Ferrari fourth. Needless to say, the Jaguars set up a new G.T. lap record, both doing 1:58.2.

After the race Graham Hill summed up the car as "fabulous." He described the handling as "up to racing car standards," and said he felt the overall performance was "quite outstanding for a production car." A few days later I was able to go for a run in the same car, as a result of which I can endorse everything Graham said.

From whatever angle it's viewed, the E-Type is undoubt-

edly a thoroughbred. The cockpit layout is most impressive, with wood-rimmed steering wheel, matching tachometer and 160-mph speedometer, and a central console of clearly-labeled switches and instruments. Leg room is definitely lacking, however.

The hood stretches out ahead. The engine starts easily and at idle burbles almost inaudibly. But put your foot down and it rockets up to 40 mph in first gear in under four seconds, surges up to 75 mph in second gear and 115 mph in third (reaching 100 mph in under 16 seconds) and comfortably exceeds 150 mph under ideal conditions. Alternative gearing would allow an even higher maximum speed, at some cost in acceleration and top-gear flexibility.

To put the character of the E-Type in its true perspective it must be emphasized that this performance is provided by a car which is also completely at home in city traffic, which will pull away from a standstill in third gear (and accelerate vividly to 115 mph in the same ratio) and returns at least 14 mpg no matter how hard it's driven.

But straight-line performance is only part of the appeal of the E-Type. Even more impressive is the handling, which sets entirely new standards not only for Jaguar but for all cars of this class. In general terms the handling characteristics can be compared with those of a good Lotus Elite, which can be taken as high praise indeed for a car which is twice as heavy as the Elite. There is very slight initial understeer, but this can be more than balanced by steering with the throttle, and thanks to the remarkably progressive action of the rear suspension the E-Type can be driven through corners at speeds much higher than all previous production Jaguar sports cars.

The rack-and-pinion steering is beautifully light and precise and transmits very little road shock to the wheel. A little more effort is required at parking speeds, but who wants to park this car!

At high speeds the E-Type runs straight and true, being affected little by either crosswinds or surface irregularities. It also provides a remarkably good ride over poor surfaces, further proof of the advantages of independent rear suspension with its consequent reduction of unsprung weight. The rubber mountings of the rear suspension sub-frame effectively insulate the interior of the car from transmission and road noise.

The Dunlop disc brakes – mounted inboard at the rear – slow the car reassuringly from high speed. Pedal pressure is rather high at low speeds, but this is a small price to pay for brakes which are effective even at 150 mph and virtually immune to fade. The clutch pedal has a very long travel and so has the shift lever, but this is not a car which requires frequent use of the gearbox. Indeed it will outpace anything else on the road using only top gear!

The E-Type Jaguar combines sports-racing car handling and performance with a degree of comfort and refinement normally found only in high-quality sedans. Everything about it is smooth – the lines of the body, the magnificent XK engine, the behavior of the Dunlop R5 tires on a fast corner. About the only major criticism that can justifiably be made is that the open car lacks luggage space, and even this doesn't apply to the coupe.

At the price there is nothing to compare with the E-Type for all-round quality. In fact there is nothing quite like it at any price!

CARLING

Dennis May blueprints the racing reasons that make sheep farmer Jim Clark a force to be reckoned with.

UPCOMING LOWLANDER

► "Practical rather than scientific" is how Jim Clark describes his approach to motor racing, and results vindicate the recipe. In 1960, his first season on cars with visible wheels, also his first on a factory team, he infiltrated the top half of the World Championship table – eighth out of nineteen, level with Richie Ginther. Consensus in two far-apart fields, sheep farming and Grand Prix, is that this 25-year-old Scot from Duns, Berwickshire will go far. What remains to be seen is which direction he'll take.

Personally he's devoted to both professions, but filial loyalty exerts a pro-mutton pull that may eventually be decisive. Clark is uneasily conscious that his oat sowing with Team Lotus never would be possible if his father, himself a lifelong sheep man and disenamored of speedsport, ever opted out of the watch he keeps over Jim's farm in the boy's frequent absences. If it comes to a pinch, Clark will, I think, sacrifice racing to sheep raising, but not vice versa. Let's hope the pinch doesn't come before he's had time to turn his rapidly ripening experience as a Grand Prix driver to history-making account.

"The fact that the established experts . . . adopt a particular method or technique is not sufficient reason for *him* doing it that way – if something else comes naturally, he'll try it, no matter how ham it looks." The quote is from our profile of John Surtees in last September's SCI, but you can transplant it to Clark without changing a word. That isn't to say the Londoner and the Lowlander are obstinately self-opinionated; it's just that nature endowed them both with brains and they like to use them, for better or worse. In Clark's case, the reluctant abandonment of a nonconformist habit, in deference to criticism from outside, had sorry results one time last year. The story comes in two complementary episodes, and this is it:

Clark's earliest mount was this much used and abused DKW 1000. It was raced (as here) in innumerable Scottish club races and autocross events.

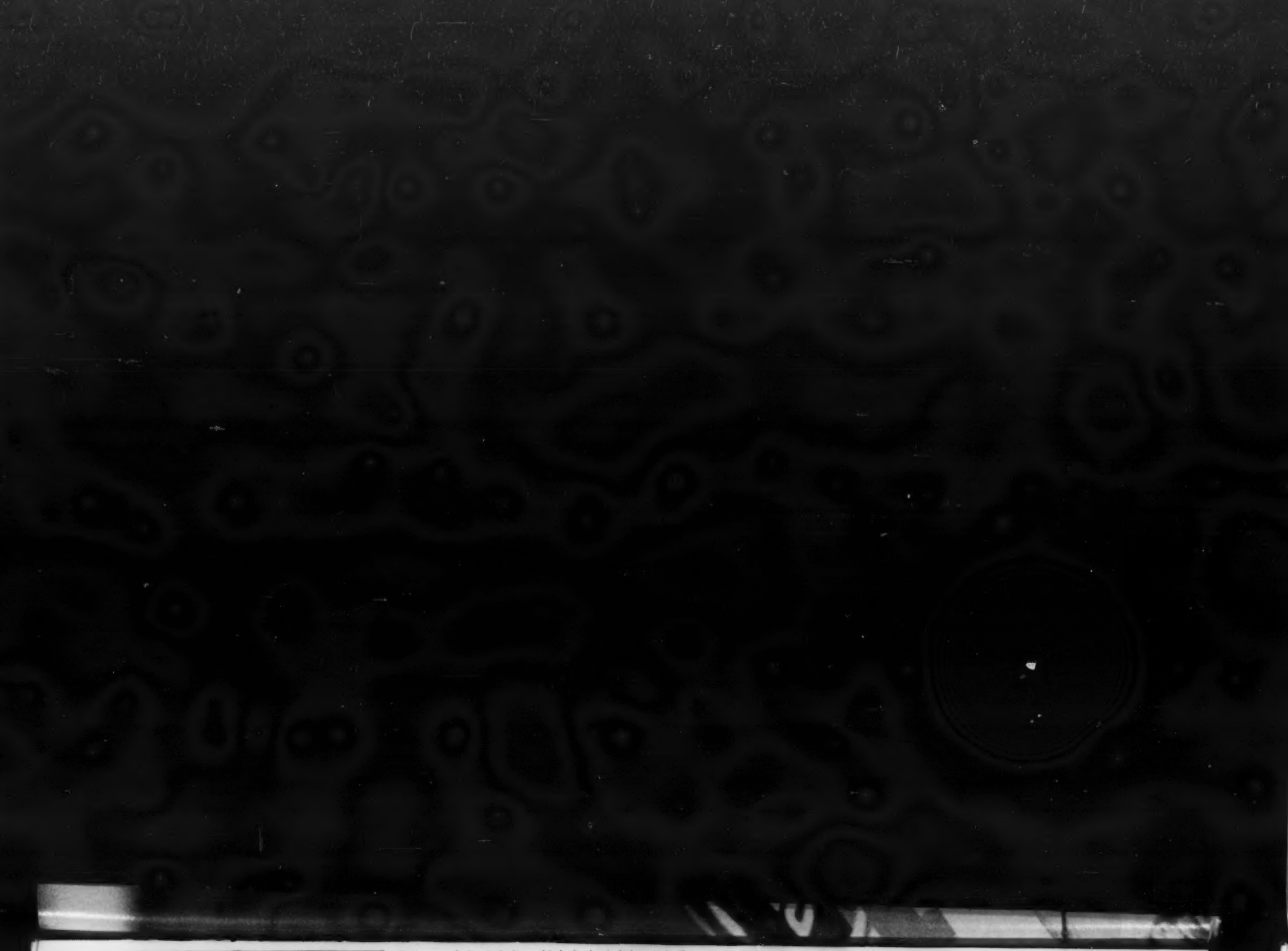
A far cry from sedan racing is this 3.5 Lister-Jaguar that Jim drove at Aintree for the Scot Border Reivers racing team in 1959. In his first season with this stable he had twenty wins.

In September, in the Gold Cup F.1 race at Oulton Park, England, Jim put his Lotus into a dramatically tight "tow" behind teammate Innes Ireland's similar car. Neither was exactly hanging about, as you can believe when we add that they both passed and led Jack Brabham, fair and square. Later, the Team Lotus pair came up behind, and prepared to lap, Brian Naylor (J.W.B. – Maserati). Naylor saw Ireland in his mirror and let him through, then ducked back onto his old line, fast. Clark, unseen by Naylor, was committed to the same line. The two cars collided. Out. Clark, incidentally, had the consolation of setting the fastest lap at 97.07 mph – a sensational 2.77 per hour faster than the best turned by Moss, who won.

At the time, Jim was an undisguisedly angry man, believing it was up to Naylor, in his mobile-chicane role, to make sure how *many* cars were shaping to come through, before resuming his original itinerary. The matter became the subject of some controversy, however, one school of thought claiming that the Scot had stuck his head out unduly far in tailing Ireland that tightly under the conditions existing.

In the eight weeks separating the Gold Cup meeting and the U.S. Grand Prize, Jim mulled the thing over in his mind and decided that, experimentally anyway, and against his better judgment, he'd abate his pickaback technique. If you were at Riverside you probably know where this resolution landed him. On lap four, while deliberately lying well back in the alleged interests of peaceful coexistence, he followed Surtees into Turn 6, which in fact is two merging turns with a configuration that obscures the second from the first. Surtees spun his Lotus on the exit from part two. Clark, from a position of visual disadvantage, couldn't see what gave until it'd given; committed to a line that the broadside Surtees car was occupying, he smacked it.

Four months earlier, in the international Silver City Trophy feature for F.1 cars that inaugurated the extended (2.65 mile) Brands Hatch circuit, Clark had given an unforgettable demonstration of his breathing-down-collars specialty. The collar in question was the World Champion's, and Jim's breath was still warming Brabham's backstud when, after 22 laps out of 50 for a finish, Clark's gearbox surrendered and he quit. This time he merely *tied* for fastest lap (synonymous with a lap record, of course, on a virgin circuit), duplicating Brabham's (*Continued on page 78*)



STUTTGART

Bud Kennedy and Don Collins mated a big-inch Chrysler and an Indy-type chassis to produce a versatile sports car that's. . .

HARDLY HIDEBOUND

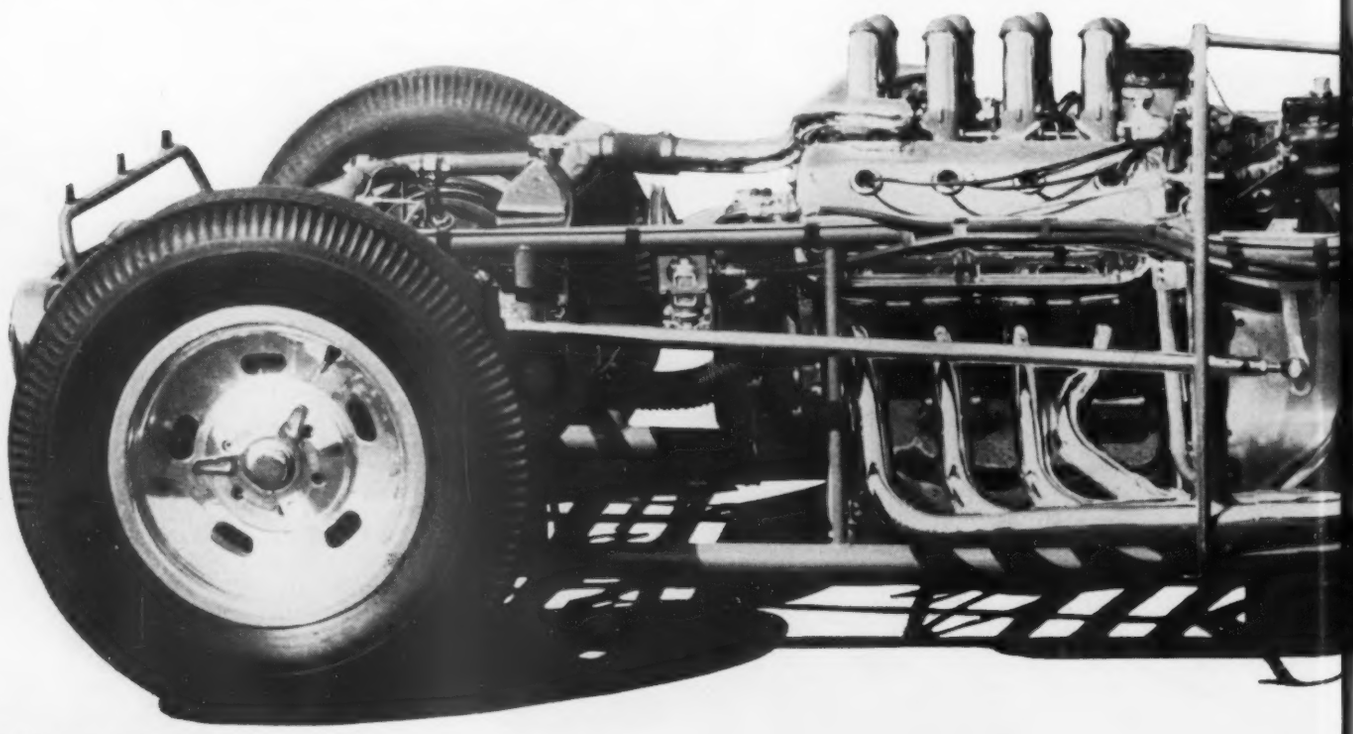
by Pete Sukalac

► After watching sports car specials of similar design, similar power, and similar performance turn up on the various circuits throughout the land, more than one observer has opined that Chevy engines and chassis components are either the best ever or the builders all have one-track minds. Then again, car designs perhaps reflect conformity to a stereotype. Why take a chance on an unknown quantity and face ridicule when it is so easy to copy an outstanding original?

Occasionally a new design does show up, though, and like a cool breeze on a hot August night, it fills one with fresh enthusiasm for the morrow. The Kennedy sports car recently unveiled on a lonely airport strip near McMinnville, Oregon, is just such a design. This car was born of a desire to escape from hidebound concepts of suspension, frames and power.

Bud Kennedy is a long-time motor sportsman from Portland, Oregon. During the week he is engaged in the operation of a marine repair depot where mammoth sea-going vessels are made shipshape. But on weekends he likes to race.

For many years Kennedy had to be satisfied with whatever iron he could buy and modify. Last year he said, "Enough!" His car was sold and his favorite engine, a hairy-chested 392-cubic-inch Chrysler, was put in mothballs. But not for long! At this time chance brought him together with Don Collins, who is a builder of racing cars – track cars. At the time of this meeting Don had just returned from the East where he had been building and rebuilding some Indy chassis for Tony Hulman, owner of the "Brickyard." While in the East Don had the opportunity to compare the performance of the simple, efficient, roadster-type chassis built by Watson, Kurtis, Kuzma, Salih and others of equal note with the more complicated machines either designed by European firms or influenced by them. In Collins's opinion, the roadster chassis, with some modification, is superior in every way. Since Kennedy wanted to build a new car as an advertisement

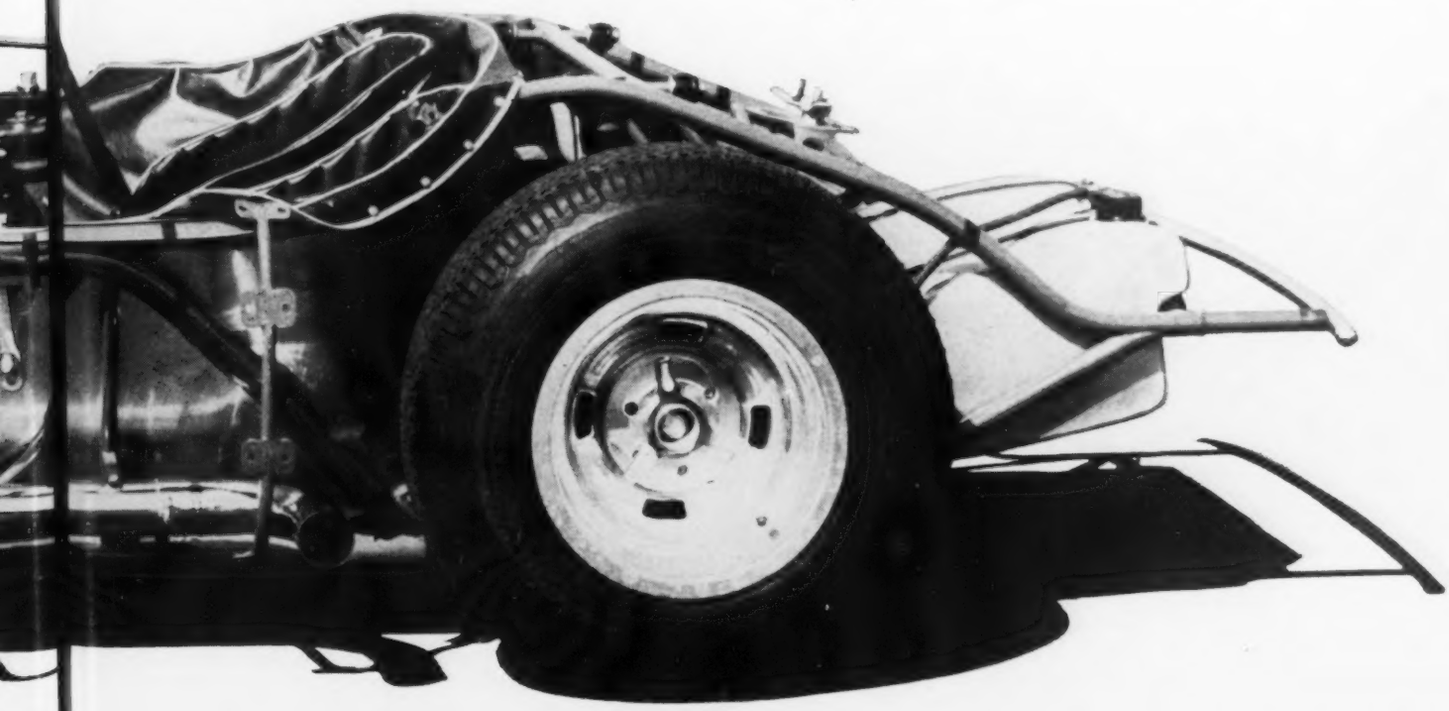


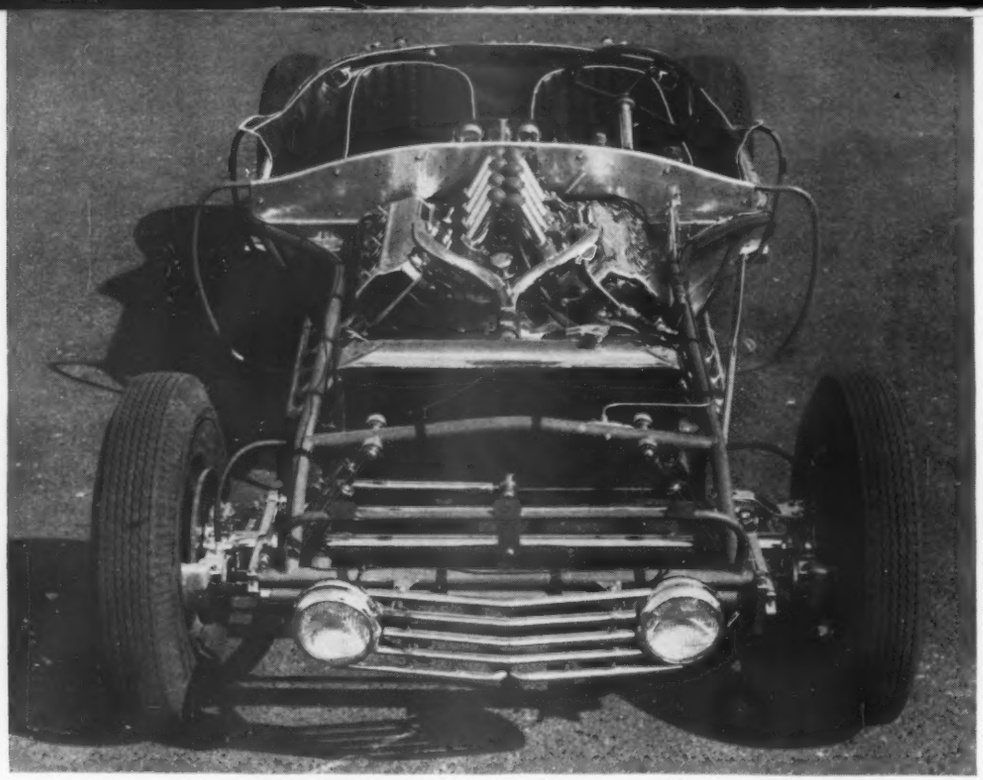
for his business as well as to race, and Collins and his ideas were available, an agreement was not long in the making. Kennedy installed the car-builder in one corner of an equipment warehouse and work was begun. This was early in the spring of 1960. Work on the new car was not on a full-time basis. Collins spent part of his work days maintaining the fleet of trucks and other equipment used by Kennedy's Pacific Marine Service.

In August of the same year the rig was ready to roll. The finished car is overwhelming. The flawless workmanship is bound to awe even the most critical engineer. To the person used to the usual space frame, multi-tube frame or platform frame construction complicated by independent suspension and huge brake drums covered by involved bodywork, the stark simplicity of this car is at first almost beyond comprehension. It reduces the factors required to move four wheels and an engine over a road surface to the lowest possible common denominator.

With the exception of the Halibrand "Championship" final drive assembly, disc brakes and mag wheels, the entire chassis was handbuilt. Chrome-moly tubing is used to form a pair of trusses that are tied together by front and back tube crossmembers, with the Chrysler mill and its mounts forming the center crossmembers. The bottom tubes are two-inch 4130 steel with a wall thickness of 0.083 inch, while the top tubes are of the same material in one-and-a-half-inch diameter. The truss members, body formers, engine supports and other braces also use this material, but in 7/8-inch tubing.

The wheelbase is 100 inches. The front axle is a straight two-inch tube of seamless material having a wall thickness of 3/16 inch. It is suspended from the frame by a pair of parallelograms formed by the arms of the torsion bars at the front and radius links of the same length at the rear of the axle. The torsion bars, which are of 4142 one-inch steel stock, are housed in the two tubes that form the front crossmembers. A Watt linkage at the center of the axle fixes





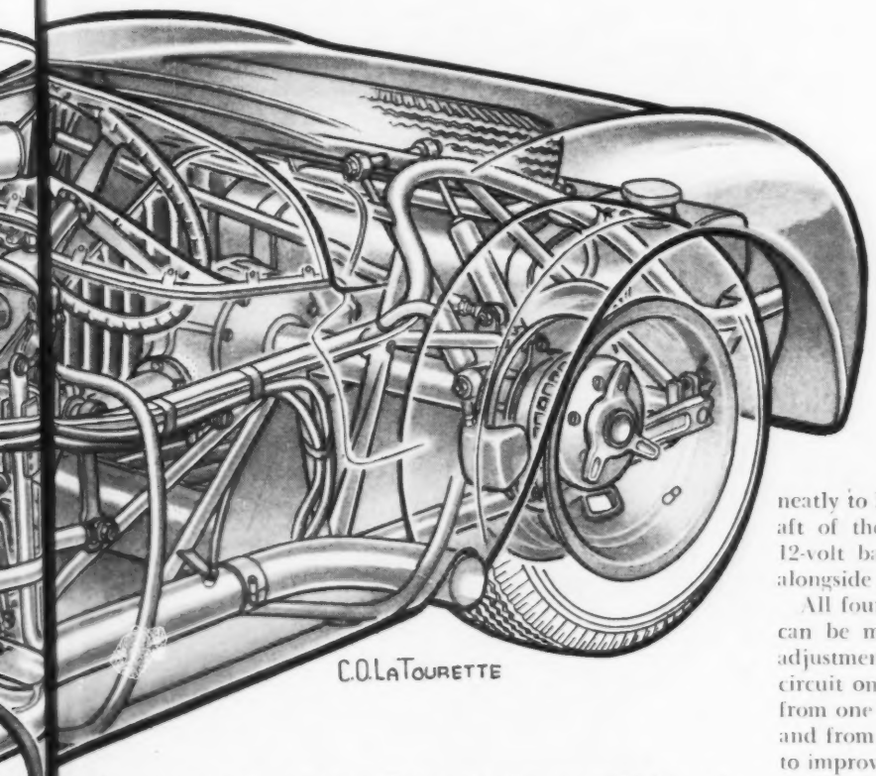
Indy-style front axle is controlled by four chromium-plated Gabriel shock absorbers. Transverse torsion bars in front of the axle are housed in the chassis crossmembers. Drag links aft of the axle complete the suspension.

lateral movement through control rods running to the sides of the frame. The rear drive assembly, with its three-inch axle, is held in position by the driveline housing and suspension members that are duplicates of the front, but with the positions of the torsion bars reversed to the rear of the axle.

The front spindles, though not recognizable as such, are modified International 1½-ton truck spindles carrying Halibrand disc brakes. The rear hubs are completely hand-made. Front and rear axle movements are damped by dual sets of Gabriel tube shocks of the 60/40 double-action type. The steering gear is Ross with a fast action requiring but 1½ turns from lock to lock. All control arms, linkage and tie rods are equipped with Heim ball joints. The modified Bangert fiberglass body fastens directly to the chassis via Dzus quick-detach units. Weight of the complete chassis accounts for but 1100 pounds of the all-up car weight of 1900 pounds.

The heavy 392-cubic-inch Chrysler engine and '41 Cad gearbox are mated by an adapter bell housing. The box, in turn, is mated to the Halibrand driveline by a handmade adapter. The bell housing is completely enclosed by a safety

Bud Kennedy (right) checks out driver comfort in completed car with builder Don Collins. Chromed, braced roll bar is a nice finishing touch.



"The stark simplicity of this car is at first almost beyond comprehension."

housing of ¼-inch steel. This looks like an expensive die pressing. It is expensive, but it is not a pressing. Collins made the housing from steel plate—cutting and fitting to form a segmented shell, then welding the pieces together to form the whole. It's a tedious and difficult way to cover a clutch that may never explode, but then the price of legs is high.

The chassis tubing is painted Valiant Red to match the finish on the body. The running gear, all linkage, bell housing and guard and the gearbox housing are cadmium-plated to protect them from the elements.

The full bucket seats used in the Kennedy car are set just forward of the rear axle. The engine is mounted well back of the front wheels, its position dictated to some extent by the leg room requirements of the driver. The clutch and brake actuating levers are both firewall-mounted. The location of the engine positions the gear lever so it falls neatly to hand. A 20-gallon aluminum fuel tank is suspended aft of the rear axle at the very rear of the chassis. The 12-volt battery is also mounted at the rear, and is secured alongside the fuel tank.

All four of the torsion bars are fully adjustable. The ride can be made as taut or soft as conditions require. These adjustments are also used to compensate for the type of circuit on which the car is driven by transferring the weight from one side or the other to improve cornering capabilities, and from the front to the back to adjust weight transfer and to improve traction during acceleration.

Acceleration in the Kennedy car is fierce. The Chrysler used at the present time is based on a 1957 block, which is the only stock component. Bill Schnell's Custom Automotive in Portland, Oregon, builder of this powerplant, completely modified the heavy heads by grinding the ports to the limits of the gaskets to improve the breathing capacity. The valves and valve gear have been lightened. An Iskenderian "7000" T cam kit is used. The fully balanced crank kit includes reworked rods and Jahns pistons.

Driving the car is no chore. The steering is light once under way, and with the perfect balance of power and weight the handling must be experienced to be believed. It's already competed successfully in the drags, it's scheduled to do some road racing, and it's expected to appear at the Bonneville Nationals with a more aerodynamic straight-line shell. Altogether it's a very desirable piece of machinery of impressive versatility. —*PS*

Road Research Report: LANCIA FLAVIA

► If Russia's Cosmonaut had a few moments to himself after being jolted into orbit, if he could switch off his headphones and savor the silence of space, he doubtless felt an eerie isolation and an astral quiet, only broken perhaps by the muffled hum of gyros deep within his capsule. A few days before this epochal achievement we had experienced a similarly eerie sensation of incredible solitude and silence in an earthbound man-carrying vehicle that might be termed the "Vostok of Turin": Lancia's new Flavia.

The above is a far-fetched analogy? Perhaps, but the Flavia deserves it completely. Unassuming on the outside, this masterfully-engineered, beautifully-made sedan makes available a new kind of touring travel. The three years expended in test-running this front-drive, flat-four chassis have obviously been well invested by Lancia, a firm that has never been associated with the orthodox and evidently does not intend to be today. Indeed, the Flavia is Italy's first large-production front-drive car.

STUDYING THE ORIGINS

With its front-wheel drive and four-cylinder, high-output, water-cooled engine placed ahead of the front wheels, the Flavia offers some clues as to the characteristics we might expect from the long-awaited small Ford Cardinal which, in one prototype version at least, is laid out in much the same way. The aluminum engine-gearbox assembly, and the fact that disc brakes are fitted, have stirred up a great deal of interest in the use of Flavia parts for a Formula Junior car. For these two reasons, in addition to the Flavia's own obvious merit as an automobile, CAR AND DRIVER now intends to discuss the technicalities of this new Lancia in considerable detail. If you're more interested in acceleration than in valve angles (and we don't blame you!) we suggest you jump to the rear of the R.R.R., but if machinery intrigues you stay tuned to this special report to C/D by Harry Mundy, Technical Editor of London's THE AUTOCAR. Harry's comments are based on inspection of the car at its Turin birthplace.

Design of the Flavia is the work of Professor Antonio Fessia, who joined Lancia during the period that the Flaminia was under development. He was responsible for the substitution of wishbone front suspension for the company's traditional sliding pillars on that car. Fessia was with Fiat pre-war and designed the famous Topolino. He left them and produced the Cemsa-Caproni, a front-wheel-drive car with an 1100 cc horizontally-opposed four-cylinder engine which appeared as a prototype in 1948. Its object was to utilize the surplus capacity of the Caproni aircraft factory during the post-war years, but the design didn't proceed beyond the prototype stage. Returning to Fiat, Fessia produced a similar layout for the Fiat 600, in parallel with Dr. Giacosa's rear-engined design which was finally adopted for production. It's logical that Professor Fessia should now propound and develop his ideas further for the Flavia.

BODY AND SUSPENSION DESIGN

The pressed-steel body shell follows normal practice for this integral type of construction. Beam strength is provided in two deep and wide sills at each side. They merge into the rear seat pan structure, the shallow channel-section floor tunnel which houses the exhaust piping, and the cowl assembly, which in turn merges into the fender valances from which a wheelbarrow box-section arm projects forward at each side. A removable front sub-frame is attached at six rubber mountings; this unit can be detached and wheeled away complete with the engine, transmission, suspension and steering linkage. Such construction allows unit subassembly during manufacture and aids service at major overhauls.

At each side of the welded sub-frame a substantial aluminum casting is bolted, to carry the wishbones, steering box and idler lever. These castings are braced with two steel channel-section box members across the upper and lower extremities of the aluminum castings. The upper one forms the saddle mounting for the transverse leaf spring, which at each outer end is

attached to its upper wishbone by a substantial rubber bobbin. The use of a leaf spring is undoubtedly related to the front-wheel drive layout, for it is quite difficult to utilize coil springs and avoid the wheel drive shafts without having an offset load on the wishbones or a high reaction point for the springs, if mounted above them.

Each wishbone has tubular arms, copper-brazed to forged steel ends. Rubber bushings are used at the inboard attachments to the aluminum casting and they are noticeable for their very wide spacing. Ball pivots spaced at 10.25 inches are used top and bottom for the outer swivel joints. Each is sealed with a rubber gaiter and has a lubrication point. Typical of the attention to detail is the construction of the upper ball joint which, on the Flavia, takes the greatest load. It is formed in two halves, with a ball thrust race between them to lighten steering loads. A French-made de Carbon telescopic shock absorber is mounted to the rear of each lower wishbone.

EXPENSIVE DRIVE AND BRAKING

Expense has been subordinated to ideal design in the construction of the Hardy Spicer front-wheel drive shafts, which are often the Achilles heel of such a layout. A constant-velocity Rzeppa-type joint of approximately 3.25 inch diameter is used both inboard and outboard. The outer case of the inner one is formed with six equally spaced semicircular grooves, matching with similar ones in the surrounding pot joint. In each of these grooves five 0.375-inch balls are trapped in position. These accommodate endwise movement of the shaft arising from wheel movements, and virtually eliminate sliding friction. Each joint is gaitered and sealed with lubricant for life. An anti-roll bar, connected to the lower wishbones, passes beneath the side members of the sub-frame.

Several types of rear suspension, including independent, were tried on the prototype car before settling on a tubular steel beam attached to a semi-elliptic leaf spring at each side. It was considered by Professor Fessia that the best compromise of handling characteristics was obtained with this light beam. Coil springs and radius arms, in conjunction with the tubular beam, were also considered, but the leaf spring arrangement made the least intrusion on the luggage space.

Dunlop disc brakes — of the same size as used on the Mark II Jaguars — are fitted to all wheels. They are servo-assisted, with separate front and rear hydraulic circuits. This independence is achieved by the use of a tandem master cylinder, each half having its own circuit to the servo unit.

MASTERFUL FLAT-FOUR

There are many attractions in a horizontally-opposed four-cylinder layout; there are also some shortcomings if the main advantages are exploited to the full. It is almost certainly more expensive than an in-line arrangement; if its virtue of compactness is utilized, bearing sizes and crankcheek thicknesses can be marginal. Lancia seems to have avoided all the snags, and accepted the greater cost involved.

Most horizontal cylinder layouts use a single camshaft in the plane of the crankshaft, but this calls for long push rods with high reciprocating mass, and thus heavily-stressed valve gear at high speeds. The Flavia uses two camshafts to overcome this defect, so that its maximum power is produced at 5200 rpm, and the engine is capable of revving up to 6000 rpm. The two camshafts are driven by a duplex roller chain from the crankshaft, the chain incorporating a hydraulic tensioner. The push rods have a duralumin tubular center section to match the expansion rates of the aluminum crankcase and cylinder heads.

If the adjacent cylinders are spaced to use a minimum fire joint between the block and the head, crankshaft cheeks and bearings are often of meager proportions. In the Flavia the design seems to have been centered initially around the crankshaft and its bearings, for the cylinders are much wider than they need to be for gasket width or water space between the cylinders. This also leaves room for future bore increases. Another factor was undoubtedly the use of opposed valves in a hemispherical combustion chamber. They have an included angle of 39 degrees, which gives just sufficient clearance for the valve springs on the adjacent intake valves, as seen on the cross-section drawing.

This opposed valve arrangement is made possible by the use of individual transverse pivot shafts, as already applied to the Flaminia. Individual intake ports are uppermost on the cylinder heads, the exhaust ports projecting downwards to separate flanges on the underside of each head. Valve head diameters are 38 mm (1.496 inch) for the intake, and 33 mm (1.300 inch) for the exhaust; these are large by current standards, indicative of good breathing over a wide speed range. The valves seat on cast-in iron inserts.

HUSKY BOTTOM END

Crankshaft bearings are massive by any standards, the mains having a diameter of 2.375 inches, and widths of 1.06, 0.93, and 1.375 inches for the front, intermediate and rear respectively. Like the mains the big ends are Vandervell indium-infused lead-bronze type with a diameter of 1.937 inches and a width of 0.875 inch. Crankcheek thickness adjacent to each main bearing is 0.5 inch, the intermediate cheeks being 0.75-inch.

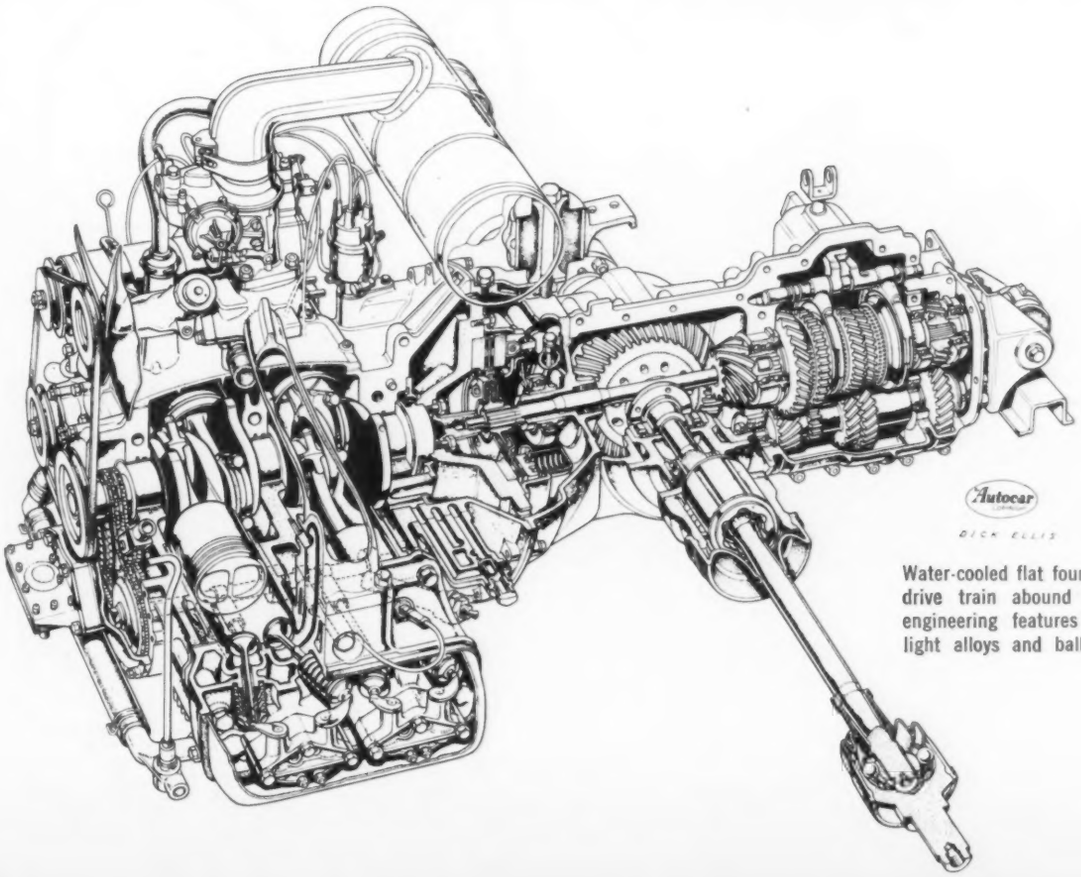
Bearing lubrication is from a Hobourn-Eaton internal-rotor oil pump with a gauze pick-up filter, and circuit through a full-flow filter before the oil is fed to a drilled gallery in the left crankcase half. Connecting rods have an angular serrated-face joint and 1-inch full-floating wrist pins. The German Mahle pistons, which have two compression rings and an oil control ring above the wrist pin, are noticeable for deep recesses in the crowns. These are not required for valve clearance at top dead center, but are undoubtedly provided for increasing compression ratio (*Continued on page 80*)

Scissors jack is worked smoothly with ratchet that also doubles as lug and spark plug wrench.

Flavia doors open wide, permitting gracious entry into comfortable, bright interior. Ample headroom, chair-height seating, almost complete absence of noise make this one of the world's best tourers.

Sectioned Lancia Flavia seat shows foam rubber interior designed to reduce vibrations. Pirelli-developed seat definitely helps reduce driver fatigue.

The Flavia is sprinkled with nice little touches such as this flush-mounted automatic door light that neatly defines the width of the door at night.

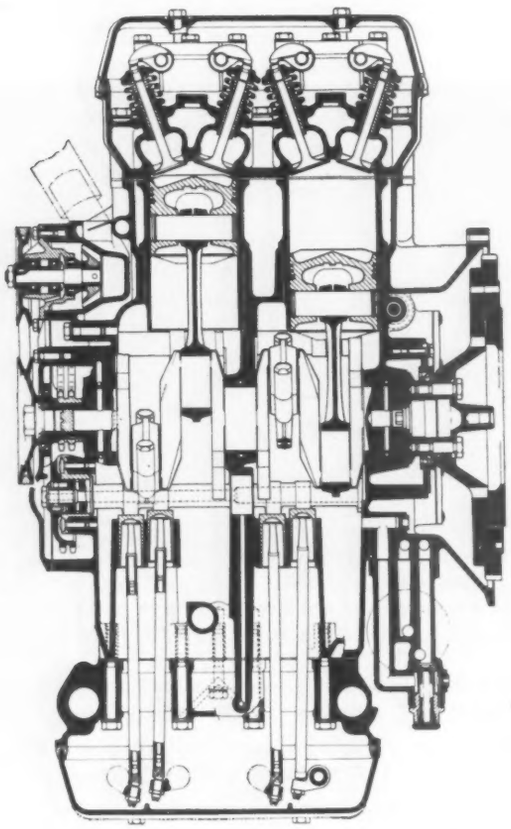


Water-cooled flat four with its gearbox and f.w.d. drive train abound with "cost is no object" engineering features such as extensive use of light alloys and ball-bearing-jointed half-shafts.

Road Research Report:

LANCIA FLAVIA

Importer:	**Hoffman Motors Corp.** **443 Park Avenue** **New York 22, N.Y.**	**9130 Wilshire Blvd.** **Beverly Hills, Calif.**
Number of U.S. dealers:	**198**	
Planned annual production:	**26,000**	
Value of spare parts in U.S.:	**$80,000.00**	



⅛ SCALE — TOP VIEW

PRICES:

Basic Price	$3695 POE New York
Dealer preparation	75
Options fitted:	
Leather upholstery	175
Anti-freeze	3
Total price as tested	$3938

OPERATING SCHEDULE:

Fuel recommended	Regular (92 octane)
Mileage	19-33 mpg
Range on 12.7-gallon tank	240-420 miles
Oil recommended	SAE 10W-30
Crankcase capacity	6 1/3 quarts
Change at intervals of	2000 miles
Number of grease fittings	4 (5 @ 6000 miles)
Lubrication interval	2000 miles
Most frequent maintenance:	Clean or replace all filters, lube distributor, tune engine—4000 miles

ENGINE: (aluminum flat four with two cams in block)

Displacement	91.53 cu in, 1500 cc
Dimensions	Four cyl, 3.23 in bore, 2.80 in stroke
Valve gear:	Two chain-driven camshafts in crankcase; pushrod-operated overhead valves inclined in horizontal plane.
Compression ratio	8.3 to one
Power (SAE)	90 bhp @ 5200 rpm
Torque	94 lb-ft @ 3500 rpm
Usable range of engine speeds	1300-5600 rpm
Corrected piston speed @ 5200 rpm	2600 fpm

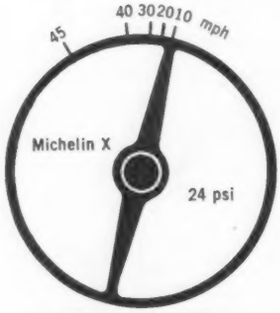
CHASSIS:

Wheelbase	104.3 in
Tread	F 51.2, R 50.4 in
Length	180.3 in
Ground clearance	6.5 in
Suspension:	F, ind., transverse leaf spring, wishbones, anti-roll bar; R, rigid axle, longitudinal leaf springs, anti-roll bar.
Turns, lock to lock	5.0 (4.2 "winter")
Turning circle diameter between curbs:	L 34 (40), R 35 (42) ft
Tire and rim size	"165" x 15, 15 x 4½ J
Pressures recommended	24 psi
Brakes: type, swept area	11 in discs; 474 sq in
Curb weight (full tank)	2540 lbs
Percentage on driving wheels	60%

DRIVE TRAIN: (Front-wheel drive, engine ahead of gearbox)

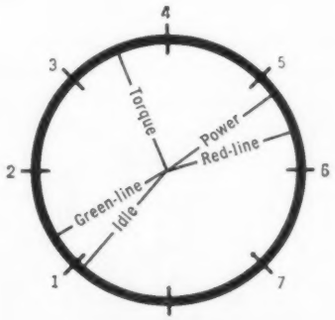
Gear	Synchro?	Ratio	Step	Overall	Mph per 1000 rpm
Rev	No	4.40		18.04	—4.1
1st	Yes	3.95	70%	16.20	4.6
2nd	Yes	2.33	42%	9.56	7.8
3rd	Yes	1.64	64%	6.74	11.1
4th	Yes	1.00		4.10	18.2

Final Drive Ratio: 4.10 to one.



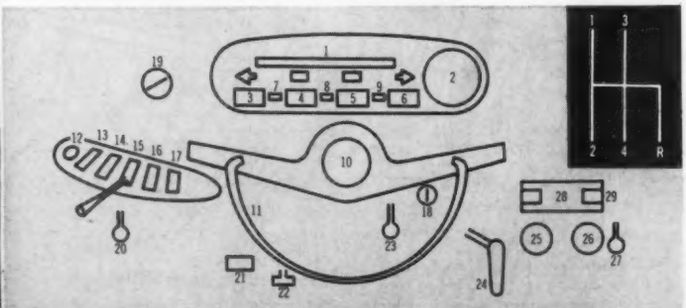
Steering Behavior

Wheel position to maintain 400-foot circle at speeds indicated.

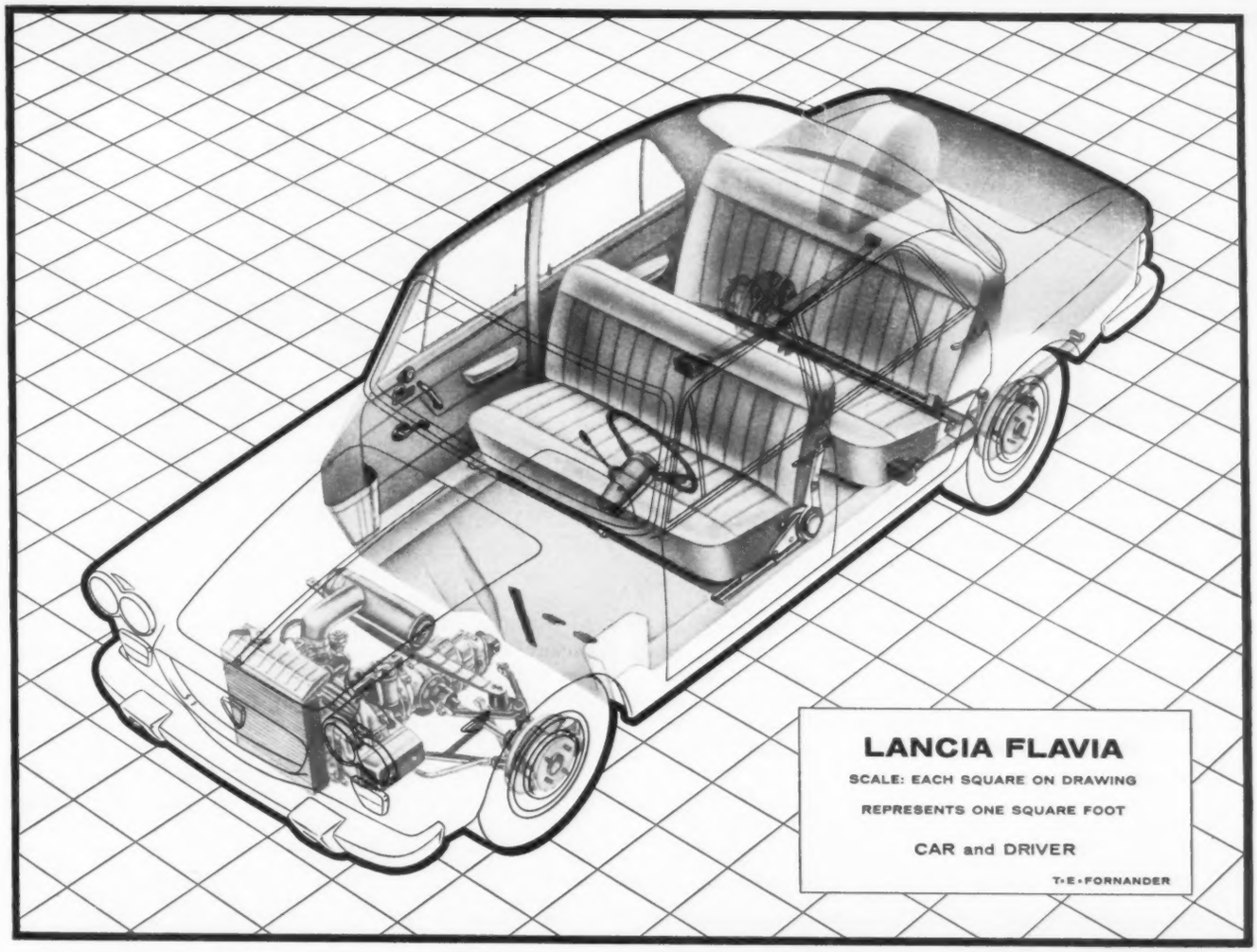


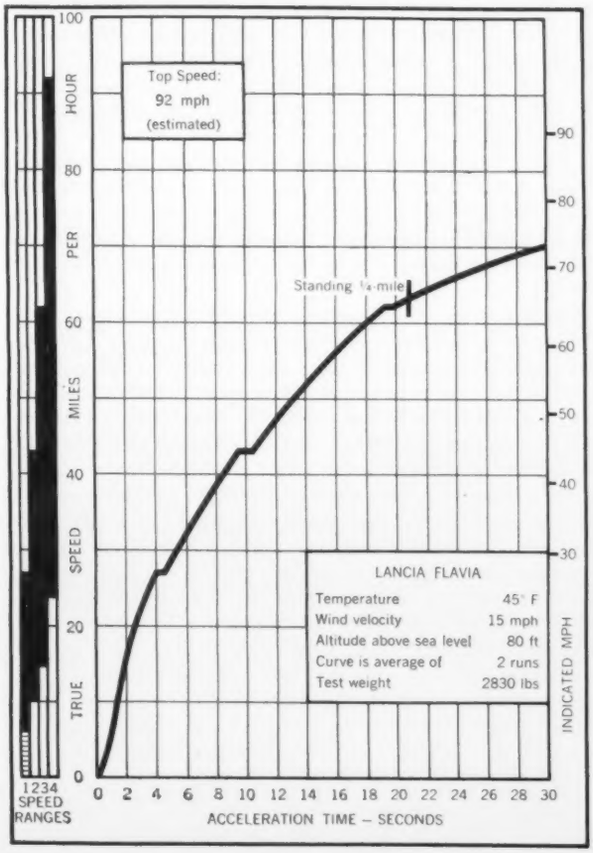
Engine Flexibility

RPM in thousands



1 Speedometer
2 Tachometer
3 Fuel gauge, warning light
4 Water temperature
5 Oil pressure gauge, warning light
6 Ammeter, generator warning light
7 Lights-on light
8 Choke & hand brake light
9 High beam light
10 High beam flasher
11 Horn
12 Windshield washer
13 Windshield wiper
14 Headlights
15 Turn signals, dipswitch
16 Heater fan
17 Parking lights
18 Ignition (push to start)
19 Ventilation outlet
20 Hood release
21 Panel light rheostat
22 Odometer reset
23 Choke
24 Hand brake
25 Temperature control
26 Heater air control
27 Heater shutoff
28 Ashtray
29 Lighter


LANCIA FLAVIA
SCALE: EACH SQUARE ON DRAWING
REPRESENTS ONE SQUARE FOOT
CAR and DRIVER
T•E•FORNANDER


Top Speed:
92 mph
(estimated)
Standing ¼-mile
LANCIA FLAVIA
Temperature 45° F
Wind velocity 15 mph
Altitude above sea level 80 ft
Curve is average of 2 runs
Test weight 2830 lbs
TRUE MILES PER HOUR
INDICATED MPH
1234 SPEED RANGES
ACCELERATION TIME – SECONDS
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
0 20 40 60 80 100
30 40 50 60 70 80 90

As deputy city editor of the London DAILY TELEGRAPH, *H. A. Vice has been in an excellent position to observe Ford's recent global power moves. He has made a special study of industrial takeovers and has written two books on the subject.*

Sir Patrick Hennessy *Henry Ford II*

Ford International: Blueprint for the Future?

by Anthony Vice

► In January the Ford Motor Company handed British investors a $360 million check, the biggest in the City of London's history, to raise its holding in Ford of England from 55 percent to 100 percent. Less than 12 months before, FoMoCo had spent $150 million in raising its stake in Ford of Canada from 27½ percent to 75 percent. Thus in 1960 and 1961, Henry Ford II had spent over $500 million, without gaining an extra foot of factory space or adding another unit to group production. What lies behind the Ford moves?

In Europe, the bid for Ford of England is seen as the key to the whole matter, for Ford has now invested more in its English company than in all its other foreign interests combined. Some commentators see two main results from this move: 1. that Ford's new small car, the Cardinal, will be made in the United States and not in Germany; 2. that this car may include components made in England, possibly the o.h.v. over-square engine now being used in the Anglia. However, there is another hypothesis which we will discuss later in this story.

Ford of England is seen as the spearhead of Ford's attack on the European market. The Dagenham factory will concentrate on Britain, Scandinavia and the sterling area, while Ford of Germany will supply Germany, France and Italy. Now that U.S. Ford owns 100 percent of English Ford it could, for instance, ship components to the United States at a cut price. If there is pressure on German Ford's capacity, English Ford could move cars into Germany, if necessary slashing prices to beat the tariffs being raised in Europe against Britain and her "Free Trade Area" partners.

But there is much more behind U.S. Ford's moves than short-term planning. This takeover is seen as part of a global business strategy, spelling important moves for Ford buyers in the United States, Germany, England and throughout the world.

Henry Ford II, in explaining the bid, said, "Our objective is to obtain a greater operational flexibility and enable us better to co-ordinate our European and American manufacturing facilities, and integrate further our production lines on a world-wide basis." To expand on Henry Ford's words, see how Ford's overseas companies match their markets and the operations of other car makers.

Until close to World War II, Dagenham, a few miles east of London, was Ford's only mass-production plant outside the United States. Henry Ford began to assemble cars in Britain before World War I, in a plant bossed by Percival Perry — later Lord Perry — who, after quarreling with Ford, later headed his European production network.

In the 1920s Ford also set up small plants in France and Germany, but major expansion in Europe started only after General Motors showed that it, too, meant business in the Eastern Hemisphere. GM bought Vauxhall of England in 1927 and two years later took over Opel of Rüsselsheim in Germany.

In reply, Ford established a major production center in Britain. A whole tractor plant was shipped from Rouge River to Ireland, work began on a new giant factory at Dagenham and Ford England, set up in 1928, controlled nine European subsidiaries — a setup that lasted for over 20 years.

In 1930 Henry Ford established another big plant at Cologne, Germany, in a deal with Chancellor Konrad Adenauer, then Mayor of Cologne, but England remained Ford's major European center. Investment in Germany was held back during the Hitler régime, while the French factory suffered from the financial discrimination against foreigners which was practiced in the 1930s.

Automotive men in Britain say that Ford never broke through in Europe. In France, where Ford set up a plant in the 1920s, early post-war-II models were not outstandingly successful. A few years ago Ford threw in its hand there and sold out to Chrysler, which now has a 25 percent interest in Simca, France's biggest car maker after the State-owned Renault firm. A superb new factory has replaced the old Ford plant.

In Germany, by 1959 (some European companies have not yet published details of 1960 output) Ford of Cologne was still only the fourth largest car producer, making just over 100,000 units against Volkswagen's 600,000, Opel's 240,000 and Daimler-Benz's 170,000. Consoling Dearborn was its 99-percent control of German Ford. After owning 85 percent for many years, Ford had been sharply criticized by German financial interests for its tight dividend policy and had been compelled to offer to buy them all out.

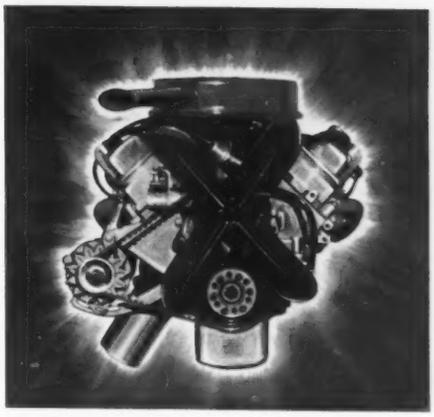
English Ford, in contrast, had leaped ahead making 320,000 units against German Ford's 100,000. Sir Patrick Hennessy, its forthright Irish-born boss, who learned the business in Ford's Cork, Eire company, had competed brilliantly both with General Motors' Vauxhall subsidiary and with British Motor Corporation, the giant Austin-Morris combine.

Dearborn's offer for British Ford represented a major vote of confidence in the British management, as reflected in the 1956 to 1959 model changes. Britishers had suspected American criticisms of Dagenham's early medium-size models, the Mk I Consul (1½-liter) and Zephyr (2¼-liter), which lasted from 1950 to 1956. Ford's side-valve (*Continued on page 69*)

OLDSMOBILE *Announces...*

F-85 Cutlass

with the exhilarating new
ROCKETTE 185 Engine!



Sports-car dash! High-performance, all-new aluminum Rockette V-8 Engine delivers 185 h.p. and 230 lb.-ft. of torque! It features 10.25-to-1 compression ratio, a new high-capacity manifold to improve engine breathing, four-barrel carburetion and dual outlet exhausts to increase top-range responsiveness. High-torque Cutlass rear axle with 3.36-to-1 ratio makes the most of Rockette power. All *standard* equipment, of course!

Above: F-85 Cutlass Sports Coupe. Also available: new F-85 Club Coupe . . . lowest-priced Oldsmobile of all!

IT'S THE WORLD'S SMARTEST SPORTS COUPE!

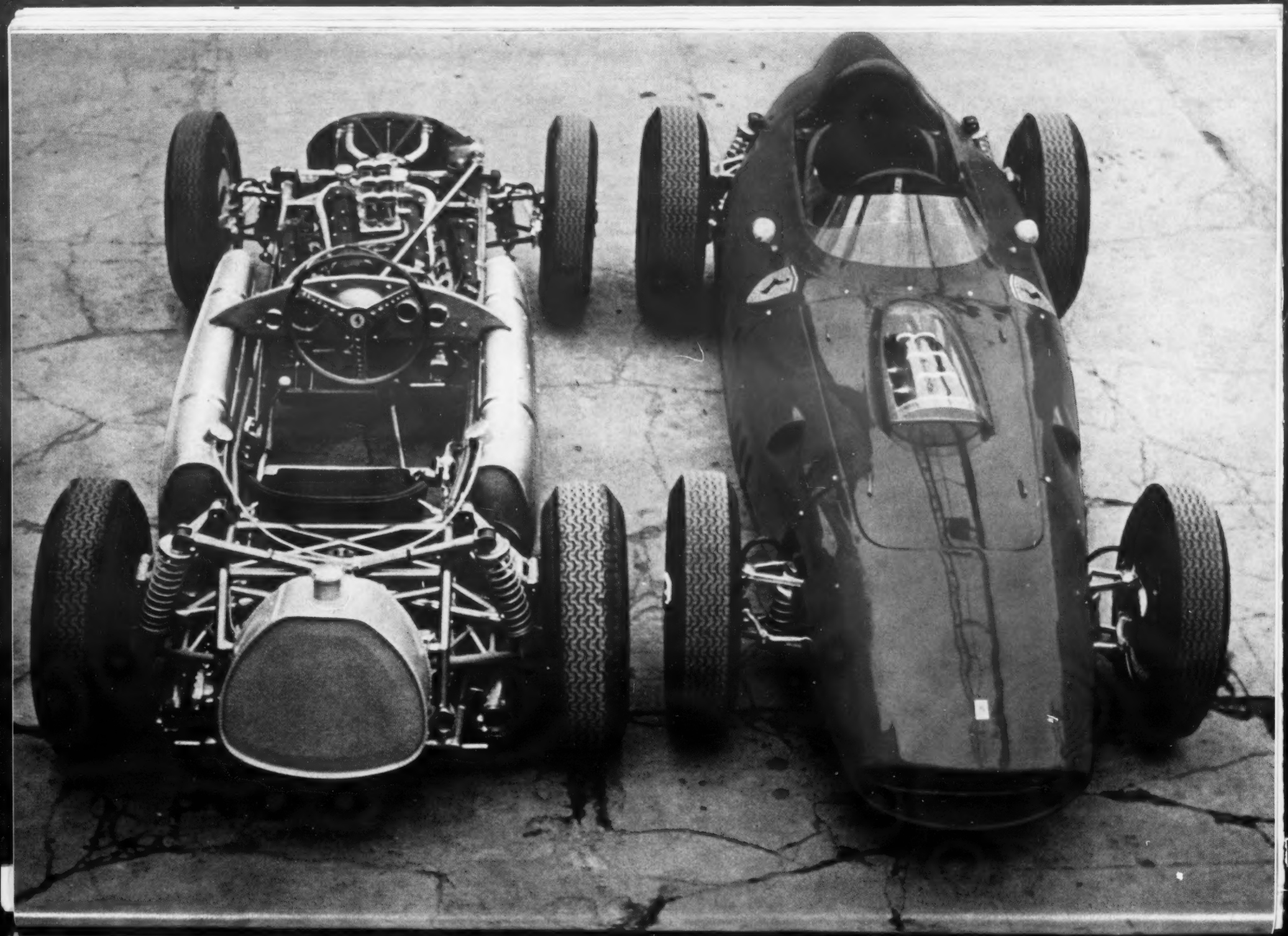
Sports-car dazzle! Wide-opening doors—padded and covered with richly-pleated Morocceen—invite you inside. Up front, foam-cushioned bucket seats . . . *standard at no extra cost* . . . combine contoured comfort with distinctive, sports-car styling! In the rear, a full deluxe-cushioned seat adds plenty of room for the entire family.

In a class by itself! Oldsmobile announces an advanced model—styled and powered to be the sportiest of the smaller cars! Slide inside this fiery new glamour coupe and see how its 185-h.p. aluminum Rockette V-8 powers you into action . . . with four-barrel carburetion, dual outlet exhausts, and high-torque rear axle! Lean back in comfortable bucket seats . . . enjoy a thrilling new sense of command in the tight-turning, easy-handling F-85 Cutlass Sports Coupe! *You* can be among the *first* to try this new, action-packed F-85 Cutlass at your Oldsmobile Quality Dealer's!

OLDSMOBILE DIVISION, GENERAL MOTORS CORPORATION

Every inch an

OLDSMOBILE



COLTRIN

WEITMANN

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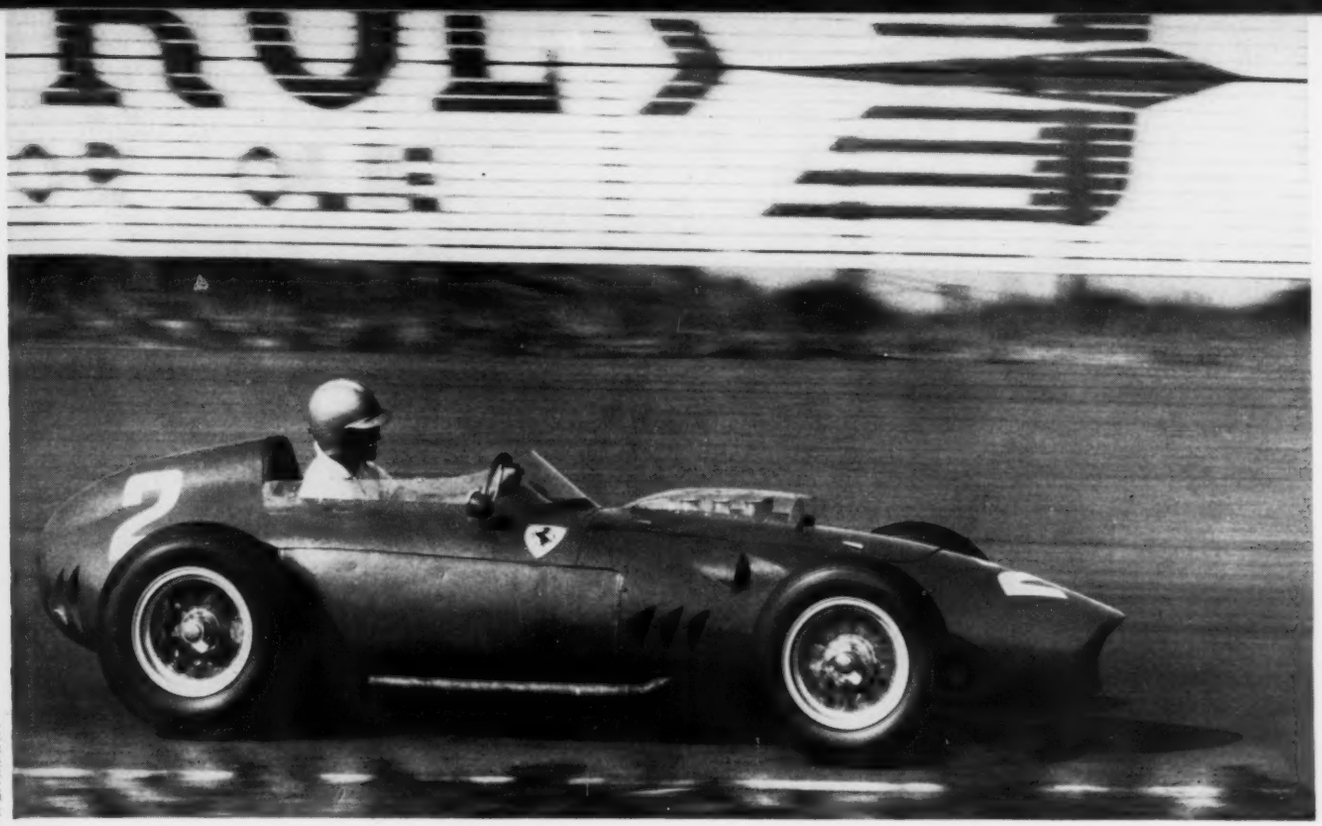
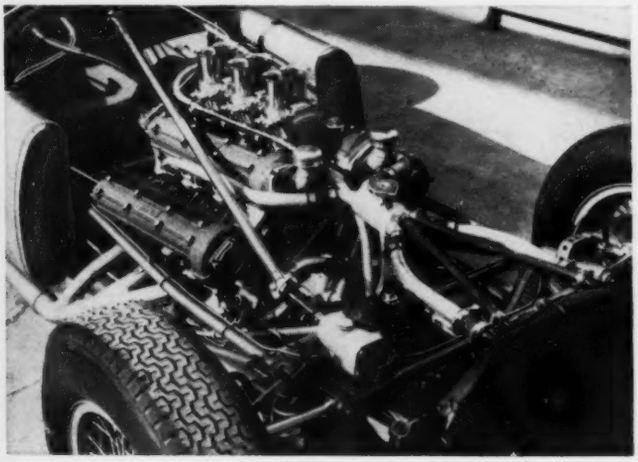


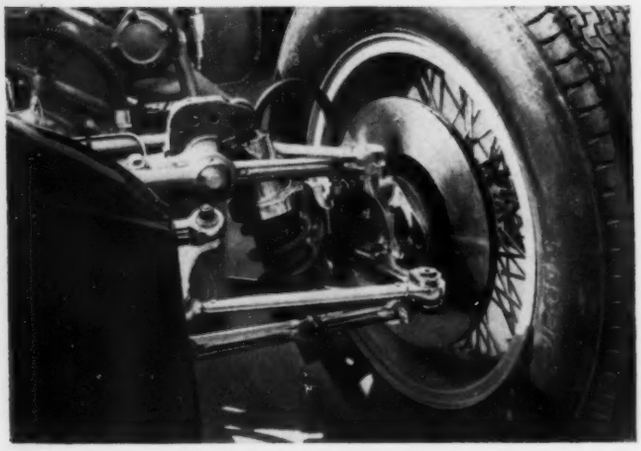
WEITMANN

With Trips in action at Zandvoort, C/D salutes the now-extinct front-engined Grand Prix car.



COLTRIN

This display chassis for the Turin Museum is magnificently prepared, with ample use of chrome and crackle-finish paint. Conventional worm and roller steering and forged front wishbones have gone the way of the front engine too, in favor of rack and pinion and welded-up tubes.

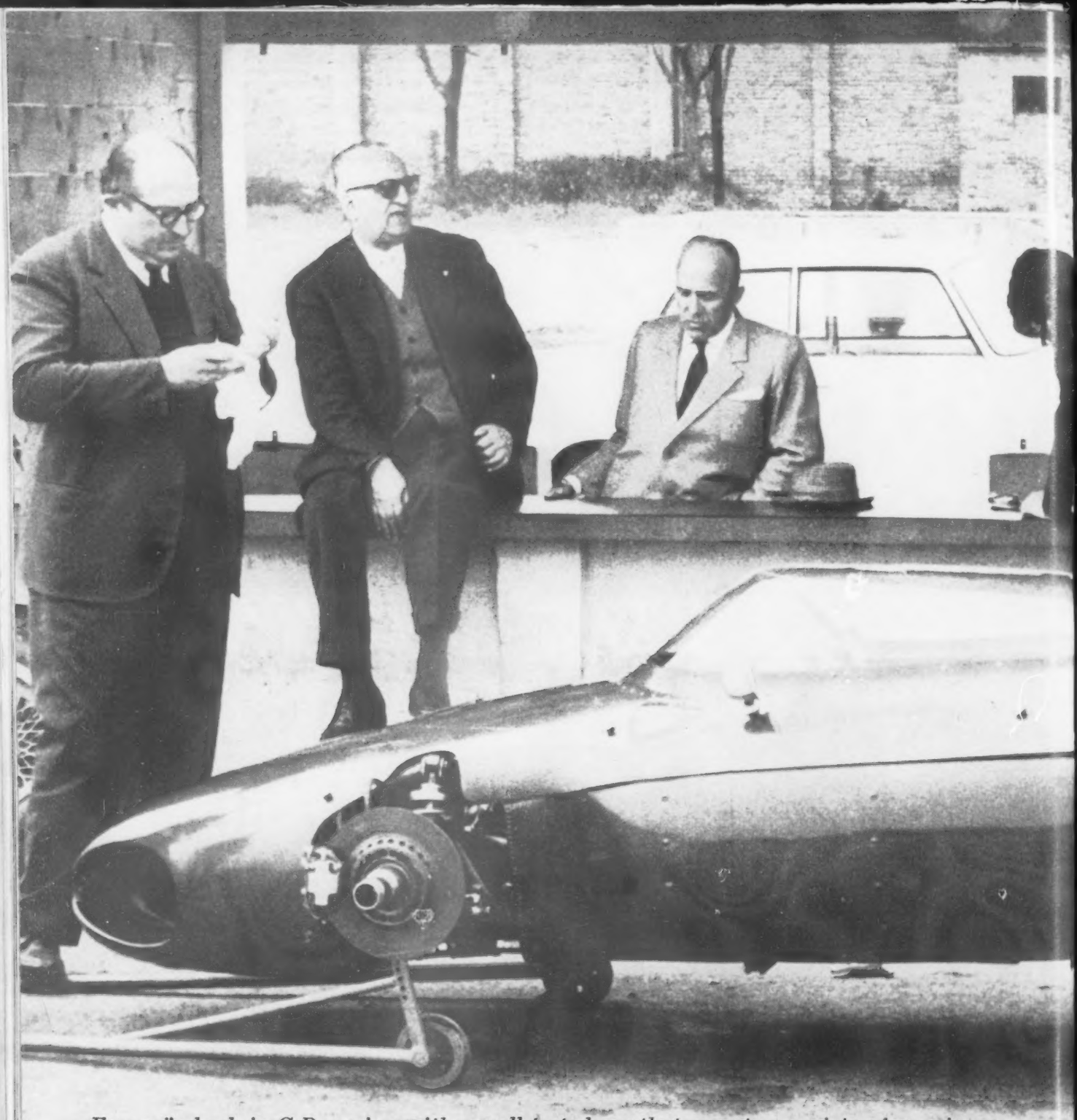


FERRARIFERRARIFERRARIFERRARIFERRARIFERRARIFERRARIFERRARIFERRARIFERRARIFERRARIFERRARI

ferrari F. 1/60

► These racing cars are museum pieces. They are literally, for the chassis at the left is bound for the *Museo dell'Automobile* in Turin and the complete car alongside will soon be seen in the Henry Ford Museum in Dearborn, Michigan. They are figuratively too, since the front-engined Grand Prix car is entirely a thing of the past in this first year of the new Formula. Of course, as Zora Arkus-Duntov says with a wry smile, we may well have the front-engined cars back again after another couple of decades of Grand Prix evolution. It all depends on what the conditions are at a given time, and what resources are available to meet those conditions.

In the design of this 1960 Ferrari, engineer Chiti did his best to simulate the balance and mass distribution of a rear-engined car, by moving the fuel tanks forward along the sides and shifting the V6 engine to the rear, but in lightness and handling the British competition was still superior. The 246 Dino engine lives on, in the sensational new rear-engined Ferrari sports car (see page 60), and in 1½-liter form may still find use in the 1961 Grand Prix car described on the next six pages. With this handsome color portrait by Jesse Alexander, however, we bid farewell to the last single-seater built in the style that made Ferrari great.



Ferrari's back in G.P. racing with a well-tested car that accepts a variety of vee-sixes.

FERRARIFERRARIFERRARIFERRARIFERRARI

FERRARI

FERRARI

FERRARI

FERRARI

ferrari

F. 1/61-120°

FERRARIFERRARIFERRARIFERRARIFERRARI

► In spite of two racing years that can only be described as bleak, Ferrari (with Phil Hill) enters the '61 season the odds-on favorite to collect the World Championship. There are many reasons why, not unconnected with a certain rear-engined Formula 2 car of last season, but the main one is Power. It's personified by the chunky contours of the brand-new 120-degree V6 first shown in C/D of May, 1961. This is the story of that engine, and the capable car that carries it.

Fundamentally a new unit, the wide-angle V6 is still directly derived from the famous 65-degree Dino engine. Changes were only made where necessary to reduce weight and simplify. The history of the Dino V6, in 1½-liter form, is long and noble. It begins in the fall of 1956 when this

Designer Chiti, left, and builder Ferrari, on counter, observe Modena tests of 1960 prototype rebodied with this year's shark-like contours.

PHOTO: COLTRIN

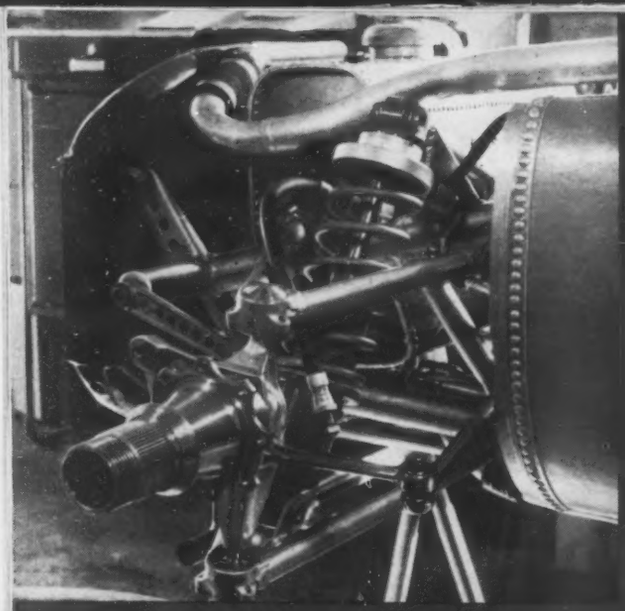
engine was first constructed around dimensions of 70 x 64.5 mm for the 1½-liter Formula 2 that was then current. Mike Hawthorn writes of visiting the factory before Christmas:

"Ferrari claimed that the engine was producing nearly 190 bhp [actually 186 at 9300], or over 125 bhp per liter, which was really phenomenal, and said that Vittorio Stanguellini, one of his neighbors in Modena who knows a great deal about extracting power from small engines, had maintained that it could not possibly produce more than 160 horsepower. He had furthermore bet Ferrari that for every horsepower he could produce over 160, Stanguellini would buy him a dinner for five people. When I saw him, Ferrari was looking forward to eating well and cheaply for some time to come."

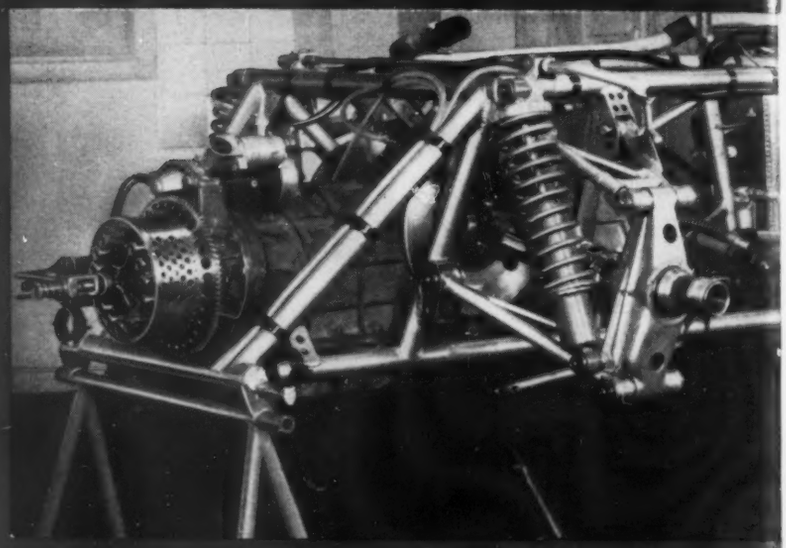
This engine first competed in the Naples G.P. on April 28, 1957, then appeared in Monaco practice and won an F.2 race at Rheims. After this Ferrari's staff concentrated on developing the 2½-liter version that won the Championship for Hawthorn in 1958, now called "Dino". The 156 Dino, as the F.2 engine was named, made assorted appearances in the next two years. In 1958 Collins drove it at Rheims and Phil Hill in the German G.P., and in 1959 Behra drove it at Syracuse and Cliff Allison used it in two races at Monaco and Rheims. All this while the pressures of G.P. schedules allowed precious little experimental work on the 156 version.

CHITI EXPLORES NEW DIMENSIONS

By late 1959 Ferrari had decided to press the development



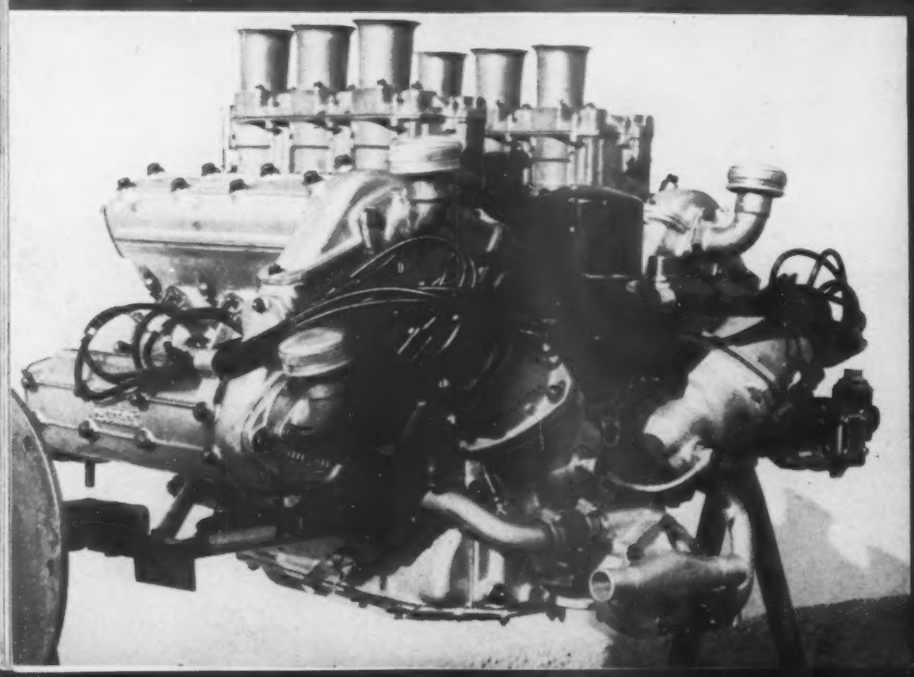
Left front suspension assembly shows tubular wishbones and new vertical post with simpler steering arm mount.



Extending well out behind the rear wheel centers, the gearbox carries the clutch at the extreme left. Multiple inner pivot points are still supplied for rear suspension wishbones.

Massive rubber coupling is fitted at the rear of the V8 crank. The drive rotation direction, viewed here, is counterclockwise.

Removal of rear gearbox cover shows one of two stepped gears and protruding shaft that's driven by the clutch.



Fully forged, machined, rod is from 90° V6. Rod for new engine is similar design but smaller and shorter.

Three bearings extend from cam housings of the new 120° Ferrari V6, which uses Marelli distributor ignition.

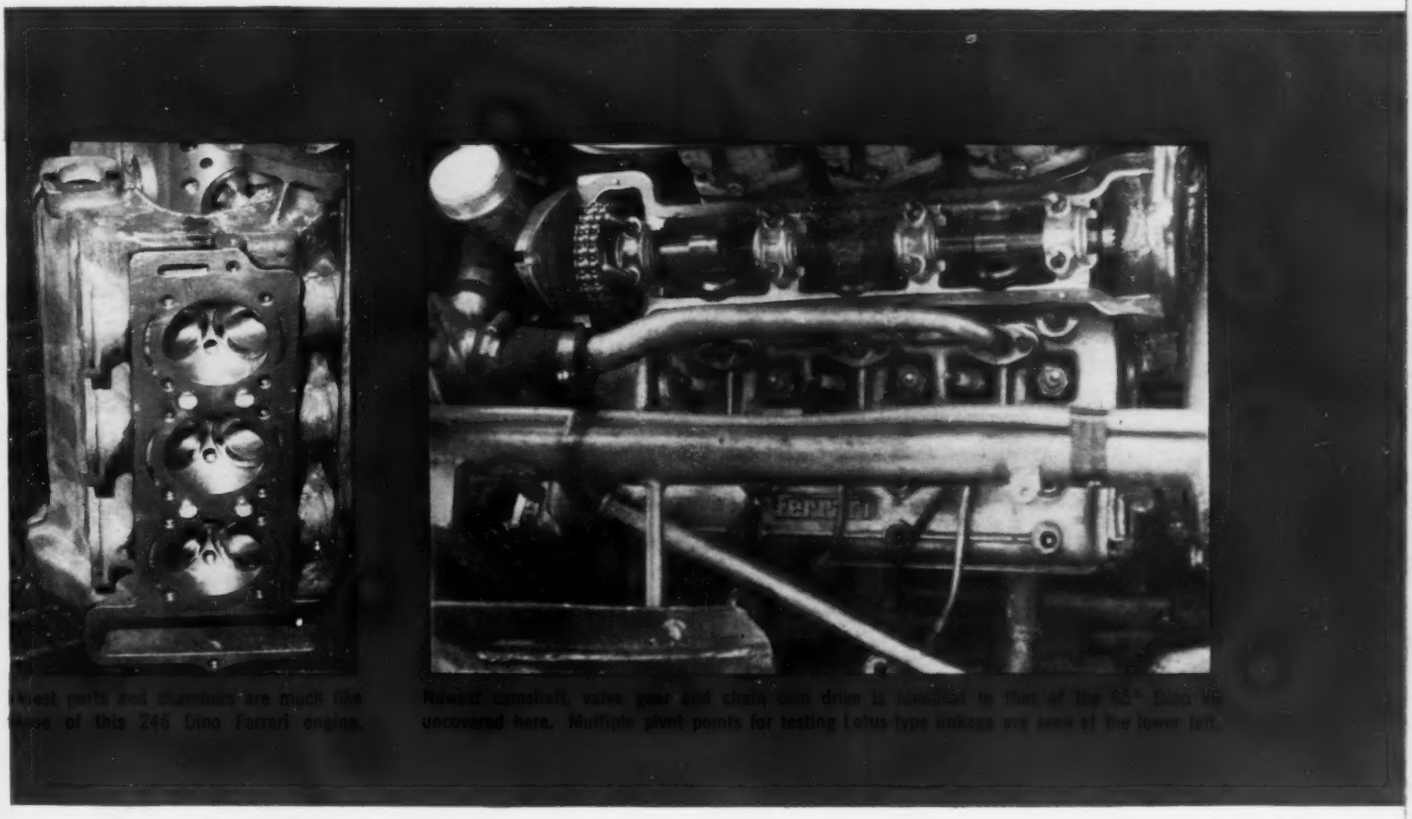
of the 1½-liter engine, in preparation for the 1961 Formula, so chief engineer Carlo Chiti was able to give it whatever attention he thought necessary. Chiti began by experimenting with the stroke/bore ratio, finally deciding on dimensions of 73 x 58.8 mm. This involved a substantial reduction in the stroke, designed to reduce piston speed and thus to allow higher revs to be reached safely (corrected piston speed at 9000 rpm was reduced from 3970 to 3860 feet per minute). It's also no coincidence that these dimensions are exactly those of the immortal 3-liter Ferrari V12! This allowed Chiti to make use of all the experience – thermal and mechanical –gathered with that great engine.

During the winter an effort was also made to improve the mid-range power of the engine, which had obviously performed well at high revs right from the start. The tail end of this program was evident at Syracuse in March of 1960, where the 156 was still mounted in the front end of a Ferrari.

FIRST REAR-ENGINED FERRARI

By early April the frame of the rear-engined car had been welded up, and by early May it took shape as an automobile. Fantuzzi finished hammering out the body and on Sunday, May 22, it was tested for the first time at Modena. It went to Monaco with a full 2½-liter Dino engine which was called a 2.1-liter unit just in case the car didn't perform to Ferrari standards. It performed very well for a prototype, after the crew had ironed out the shift linkage problems that had caused Richie Ginther to over-rev the engine violently a couple of times. In the race on the 29th it retired with a broken ring gear tooth, then was trucked straight back to Modena.

The G.P. at Zandvoort was set for the next weekend, on a track that's always been an excellent test of handling and a real challenge to the Ferraris. The team wanted very much to try the rear-engine car there, but time was pressing. In a



Exhaust ports and chambers are much like those of this 246 Dino Ferrari engine.

Newest camshaft, valve gear and chain cam drive is identical to that of the 65° Dino V6 uncovered here. Multiple pivot points for testing Lotus type linkage are seen at the lower left.

There exhaust pipes of different lengths and diameters were tried, with 36 mm Weber carbs that were unusually small for the 156 Dino. This particular engine was developing only about 170 bhp maximum but had much-improved low-end output.

Trips won at Syracuse with this car but he was led easily by Moss in the F.2 Porsche until the latter broke down. This was apparently the point at which Ferrari finally decided to build a rear-engined racing car. As recently as January, 1960, he had denied any such intention, saying, "What have Coopers done? They have taken up the idea from Prof. Porsche and, after ten years of faith in the design, are now reaping their rewards. It is only fair that if one sets out along a road, follows it faithfully and sticks to it, one should reach one's destination one day." At Syracuse Ferrari found it prudent to follow that road, too, in spite of the decades of tradition that opposed the change, in spite of the derision the Italian public had heaped on the Coopers when they first raced in Italy. It was not an easy road for him to take.

handful of days the broken ring gear was carefully analyzed, the breakage traced to a fault in processing, a new drawing made incorporating necessary improvements, and a new ring gear manufactured and installed in the car. It was at Zandvoort June 5 for the successful tests that were described in SCI's January, 1961 interview with Phil Hill. There hadn't been time to change the over-revved engine, which now began to blow oil from the breathers and generally count itself out of the race proper, but the test objective had been achieved. Now it was time to revise the car.

In the next five weeks this car was converted into a lower, sleeker 1½-liter machine. Lowness came both from trimming off the high headrest (requiring a change in magneto mounting) and from relocating the fuel tanks and the driver's seat downward in the frame. The frame was shortened at the rear by doing away with the extension originally supplied to hold the clutch throwout cylinder, a new cast caliper being hung on the back of the gearbox to do this job. In went the revitalized 156 Dino engine, with

long exhaust pipes running forward, then curling around to exit at the back in very slight megaphones. Sparkling and naive in its newness, this car – the F.2/60 – was first tried at the Modena Autodromo on July 20. By July 22 it was at Solitude for practice, and on July 24 it won its first race.

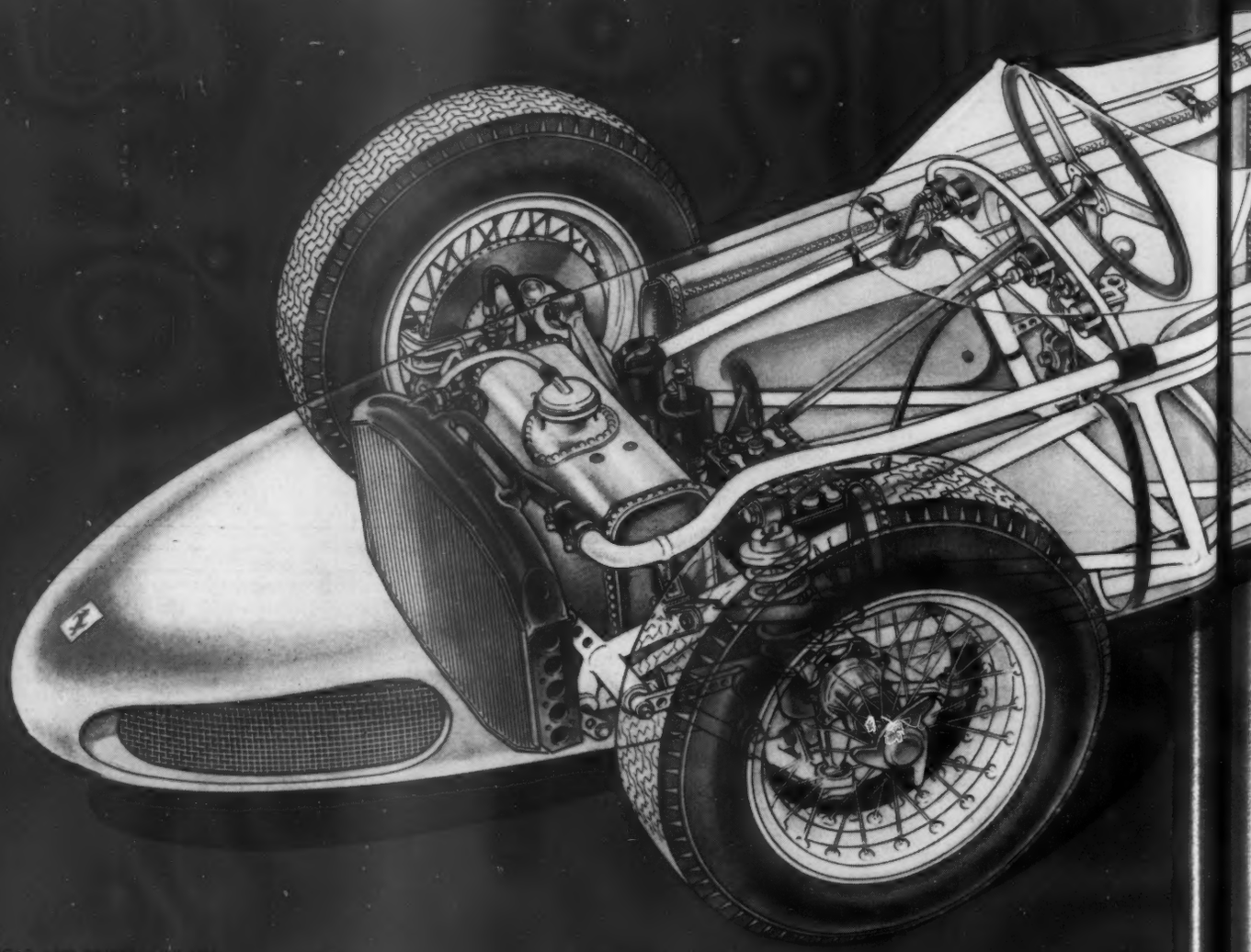
TESTING ALTERNATE SUSPENSIONS

As at Syracuse, the Solitude win was not clear-cut, though; Jim Clark's Lotus had led at first. Its rear suspension system seemed to confer some advantage, so the next experiment with F.2/60 involved addition of special mounts riddled with adjustment holes to take the long parallel radius rods of a Lola/Lotus suspension. During August Ginther and Trips tested this system exhaustively, finding that on the Ferrari it reduced the rear roll stiffness and induced more rear-wheel toe-in. The suspension itself wasn't retained but the rear wheel hub carriers were redesigned and newly cast to provide a small amount of permanent toe-in.

At the same time the front suspension was given the new geometry that had been developed in tests with the front-engined Ferraris. Hitherto the front wheels had always passed through a range of positive camber during their vertical travel; by angling the top wishbones downward toward the center of the car it was possible to preserve negative camber at all times on the outside wheel in a corner, and thus improve the front-end "bite". This also incidentally raised the front roll center some five inches above the ground. The multiple pivots supplied for the rear suspension were also used to preserve negative camber and keep the roll center high at the back end. The cutaway shows them clearly.

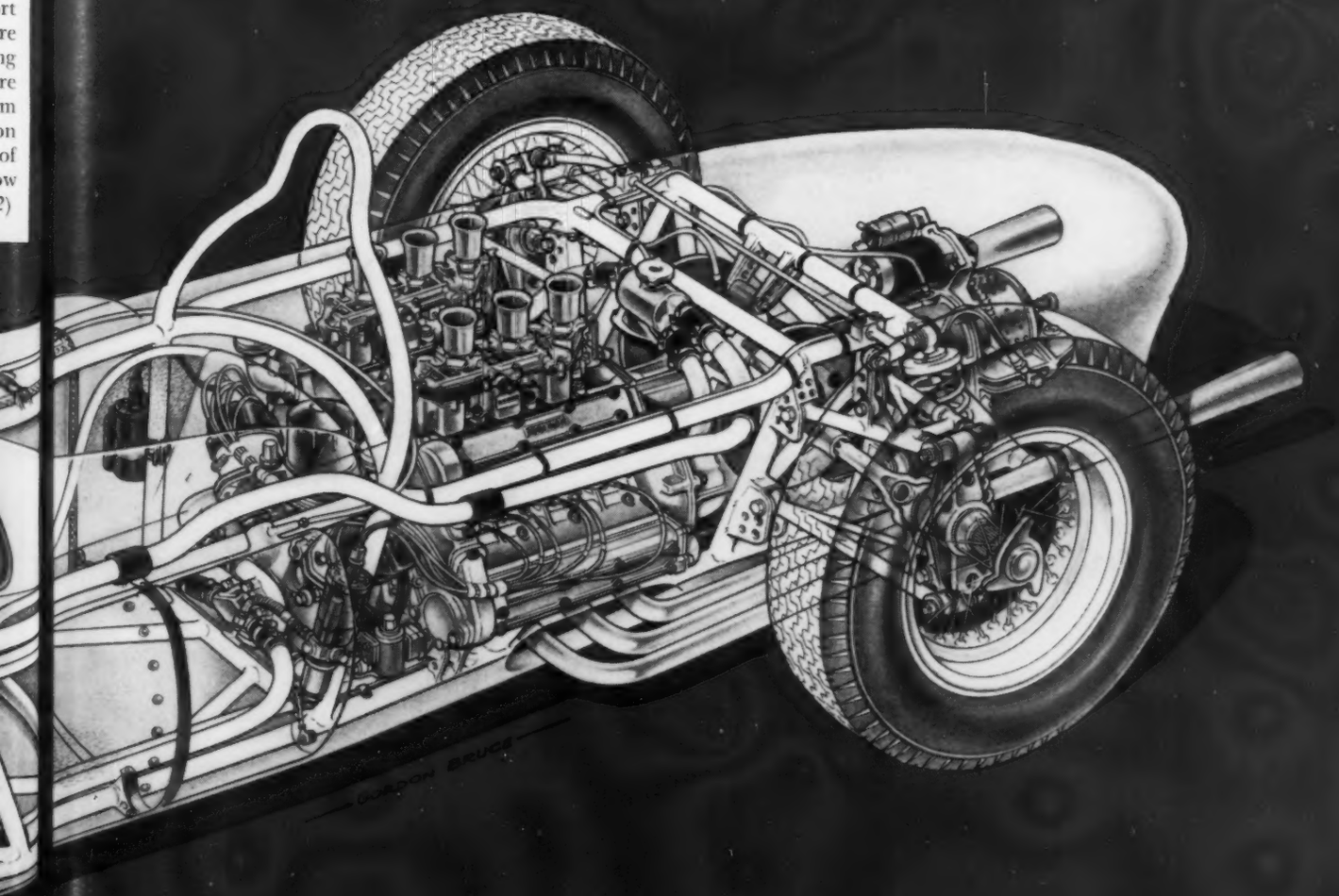
Meanwhie the Italian G.P. at Monza was approaching, and Ferrari wanted to be ready for anything the British might send (this was before they decided to decline). He put together his ultimate weapon of 1960: the 246 Dino engine in the revised rear-engined chassis. The engine bolted right in with no trouble, but it did require a supplementary fuel tank in front above the driver's legs. Added cooling was also needed but easily found. The G.P. Ferrari radiator is actually three in one: two separate side water radiators divided by a central oil radiator whose intake and outlet are both at the bottom of the core. Additional top and bottom water pipes converted the whole core to water circulation, for the big engine, and oil cooling was supplied by a big auxiliary core slung out in front.

When it was evident the British were not coming to Monza, the 156 Dino engine was put back in, the extra fuel tank was kept, and a new wider, lower radiator was made that allowed Fantuzzi to shape a new nose with a smaller opening and lower line. The two front air scoops for driver comfort were shifted back behind the fuel tank, and several more scoops appeared. Tests had shown the magneto was running hot so it received a scoop on the right, and two more were supplied for the rear brake discs. F.2/60 raced in this form at Monza on September 4, then ran again at Modena on October 2 in the same basic trim except for the removal of the auxiliary fuel tank. For test purposes this car is now fitted with the 1961 nose and tail. *(Continued on page 72)*



Ferrari's secret weapon for Italian G.P. was the 2½-liter engine in the car engine test chassis. The car never actually competed in this form.

The 156/U 2½-liter chassis (same as at left) was given the 1961 nose and tail for trials at Modena and Monza and for entry at Syracuse in April.



SPECIFICATIONS

FERRARI F.1/61-120°

ENGINE:

Displacement	89.9 cu in, 1473 cc
Dimensions	Six cyl, 2.67 in bore, 2.32 in stroke
Valve gear	Chain-driven twin overhead camshafts, coil springs, screw type tappets
Valve diameters	Intake, 38.5 or 42 mm; Exhaust, 34 mm
Compression ratio	9.8 to one
Carburetion	two triple-throat Webers
Power (CUNA)	190 bhp @ 9500 rpm
Corrected piston speed @ 9500 rpm	4080 fpm

CHASSIS:

Wheelbase	90.7 in
Length	160 in
Width	54.3 in
Height	39.4 in
Suspension	F, ind., coil, wishbones, anti-roll bar; R, ind., coil, wishbones, anti-roll bar
Turning circle diameter	44 ft
Tire size	F, 5.00 x 15; R, 6.00 x 15
Brakes	Dunlop disc, inboard rear
Fuel capacity	31.7 gal
Coolant capacity	2.6 gal
Dry weight	925 lbs
Percentage on driving wheels	60%
Gearbox	5 forward speeds and reverse, unsynchronized

The fastest two-seater ever built, this Ferrari may mature into a great Grand Touring car.

FERRARIFERRARIFERRARIFERRARIFERRARI

ferrari

246-Sport

► It's likely that the squat two-seater on these two pages is the fastest sports car the world has ever seen. By "fast" we naturally refer to speed around a closed circuit; this new 246-Sport Ferrari has proved to be faster around more closed circuits than the Maranello technicians ever dreamed. In late 1960, when the idea was first mooted of building a sports-racing car around the 2½-liter version of the rear-engine G.P. chassis, the supposition was that it might be quicker around twisty tracks like the Targa Florio but would never surpass the potent Testa Rossa at speedways like Monza and Le Mans. At pre-Le Mans trials (see page 32) this was proven false with awesome finality.

The suspension of the 246-Sport is just like that of the G.P. car described on the preceding six pages. It lacks a rear anti-roll bar, though, and in fact has a spectacular amount of negative camber at the back. The gearbox and clutch are the same design but scaled up to match the power of the ex-Grand Prix engine (270 bhp at 8000 rpm) and the added weight of the two-seater automobile (1300 pounds dry). With fuel tanks along the sides, oil tank and triple-core radiator in the front, the general layout closely follows that of the single-seater. Its wheelbase is 91.5 inches, the same as the current Testa Rossa V12 and less than an inch longer than the G.P. wheelbase.

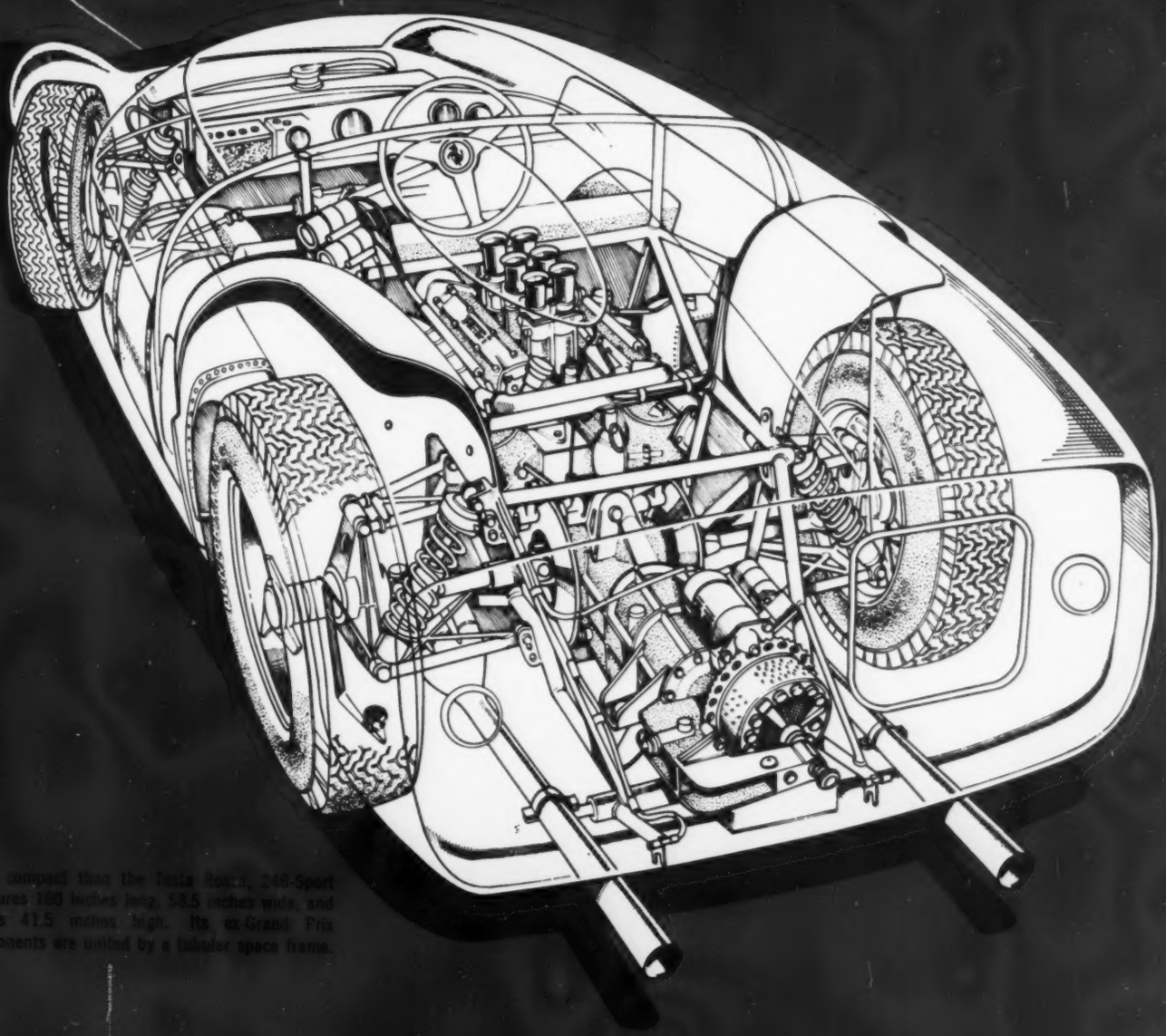
This car performed beautifully right from the day it was first fired up, requiring no major post-construction changes. The brake disc failure that caused an early incident was traced to a machining error; the tie rod failure at Sebring was unrelated to the design. In the earliest runs at Modena test driver Richie Ginther found that the car had an easy willingness to take a neutral line and hold it, to corner fast without demanding violent wheel movements, that the front-engined sports cars couldn't match. At Sebring it was proven that this Ferrari could corner much faster than the Type 63 Maseratis which, thanks to their lightness, could still out-accelerate the 246-Sport. Keep in mind, though, that the Ferrari is giving away half a liter to the Maserati, and could certainly excel on the straightaway too if fitted with the 310 bhp Intercontinental Formula 296 Dino V6. This engine would bolt right in!

The rest of this season should prove the 246-Sport to be a superb sports-racing car. But then what? Next year, of course, the sports-racing category will expire and effectively be replaced by the Grand Touring category, with its demands for reasonable production and enclosed bodywork. Let's express a hope right now that Ferrari will put a lid on this machine, simplify its structure and perhaps power it with the little single-cam Dino V6 that's now developing so well. Sold as a road car, this would be approaching the ultimate in personal transportation. But then that's always been Ferrari's business.

—KEL

Team drivers who have raced rear-engined Ferraris to date are Trips, at left, and Ginther, taking a breather while Chiti makes experimental changes.

COLTRIN



Even more compact than the Testa Rossa, 246-Sport measures 160 inches long, 53.5 inches wide, and stands 41.5 inches high. Its ex-Grand Prix components are united by a tubular space frame.

Richie Ginther considers the new 246-Sport the best-handling car he's driven. Here he bends it through a corner during tests at the Modena circuit.

by John Bentley

The Car that Made Good in a Day

STUTZ
WORLD'S CHAMPION
AUTOMOBILE NEWS
Stutz Speedsters, Roadsters and Touring Models
Prices $2000 to $2550 depending on style of body
CATALOG ON APPLICATION
Stutz Motor Car Company, Indianapolis

In the 1900s "Stutz" was synonymous with speed and reliability on any race course. Later — when coupled with the word Bearcat — it meant speedy transport for the flaming youth of America.

► In the summer of 1905 the city of Indianapolis was startled by a strange sight. Worthy Hoosiers stopped and did a double-take as a rakish, low-built, gleaming black roadster highballed past them with a noise like muted artillery. Squat and wide, despite its huge yellow wheels, the apparition cornered with a reckless abandon that would have spelt disaster to other automobiles of the time. Few got a good look at the driver, a slim young man, not yet thirty, whose lean face, enlivened by keen blue eyes and a firm but generous mouth, proclaimed character and determination. But the cop at Washington and Meridian was a phlegmatic individual. Thumbs tucked in his polished belt, he boomed, "Hey, Mr. Stutz! Ain't you scared of havin' a hoss step over you?"

The driver clanked into neutral and gave the officer a wide grin. "Aha! The horse would have to catch up with me first . . ." he replied in the slow, deliberate manner that was typical of him.

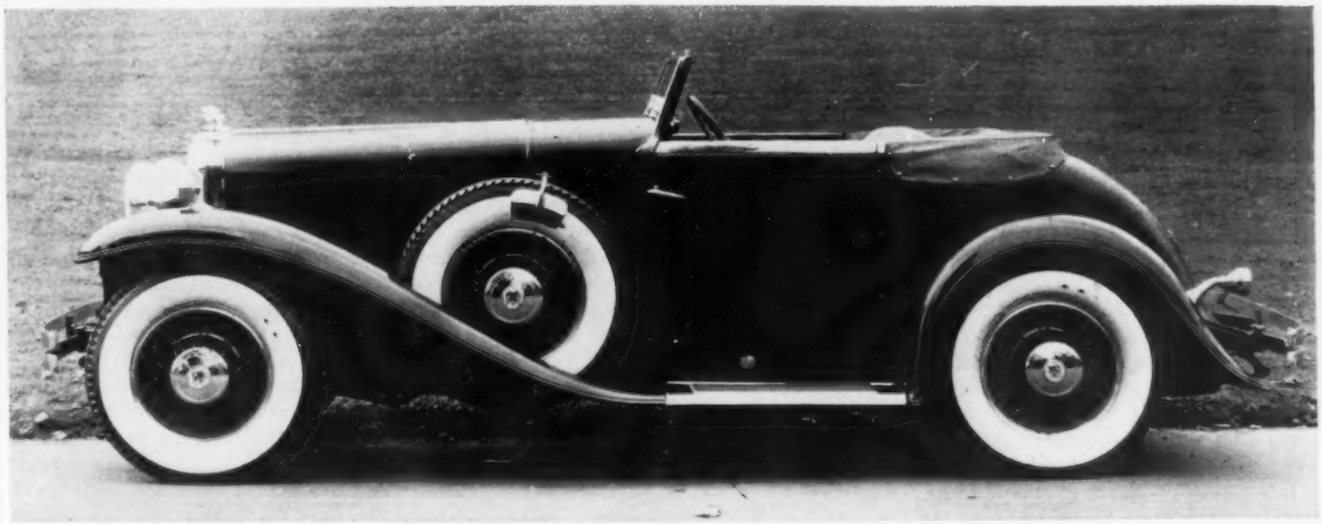
The cop was looking at the American Underslung, first production car in the United States to embody certain simple but revolutionary ideas that pinned the center of gravity much nearer the ground and vastly improved roadability. Harry C. Stutz, an automotive engineer with a reputation mainly local, was testing out over half a century ago the prototype of a design whose basic principles are still common to all modern high performance cars. Stutz created the American by inverting an orthodox chassis so that it hung from its axles instead of riding above them. Front and rear leaf springs were anchored outboard and above the frame for added stability — an idea so far ahead of its time that the design remained unchanged until 1920 when the American company folded. What was more, it had several imitators, notably the 1908 Regal and 1911 Norwalk. Advantages claimed for the Underslung included a straight-line driveshaft, low center of gravity, large wheels, *upward* spring recoil and adequate ground clearance. Other pioneering features showed up in Stutz's brainchild; for instance chrome vanadium steel, then uncommon, was used for the four-speed transmission which had its shafts and gears mounted on large ball bearings. Final drive was to a floating rear axle "that bears no weight." Machine-buffed leather stuffed with "genuine curled hair" was used for the upholstery. Cost: $1250. Slogan: "Built for the Man Who Cares."

Seven years later, a British automobile critic extolling the virtues of the Stutz inverted chassis wrote, "I hope that one of our leading makers will take up the idea, which does not involve much alteration to existing design."

But by then Harry Stutz had moved on far and fast towards a predetermined objective — the design and manufacture of his own automobile. During 1910, with the burning of midnight oil, the future Stutz progressed from the drawing board to the building stage, and Harry — endowed with a born flair for merchandising — hit on the quickest and most sensational way to get free publicity for his new car, a way that is no longer open to manufacturers.

"We'll enter it for the 500-Mile Indianapolis Sweepstakes they're planning to hold at the new track, next year," he told Henry Campbell, a close friend. "Whatever happens, more people are going to know about (*Continued overleaf*)

A 1922 favorite was this 4-cylinder, 16-valve Stutz Speedway Roadster, at $2,760 plus outside trunk. Emblem on spare tire reads "World's Champion"



"Nine chances out of ten Stutz is not the car for you" was the slogan for the 1932 DV32 Super Bearcat. Car had 4 valves for each of its 8 cylinders.

it than could ever be reached by a million dollar advertising campaign!"

This made sense. With the car as yet unknown and $36,000 offered in prize money, the designer couldn't lose. Helped by Campbell, Stutz formed a modest enterprise cautiously titled the Stutz Motor Car Parts Company, in whose name the car was entered. Then Harry invited Gil Anderson, a skilled mechanic and consistent driver, to try the machine. Anderson got an eyeful of features never before built in a race job. He noted the robust four-cylinder, 390-cubic-inch engine, cast in two blocks with a nearly "square" bore-stroke ratio for low piston speed. He examined the T-head with intake and exhaust valves on opposite sides, permitting better induction and larger combustion chambers. He liked the high-pressure lubrication that fed the bearings through galleries drilled in the massive crankshaft. Not least, Anderson was intrigued by the Stutz transmission, combining differential and gearbox in a single compact, rigid unit. A short drive clinched the matter. "It's a deal!" he agreed. "Count me in."

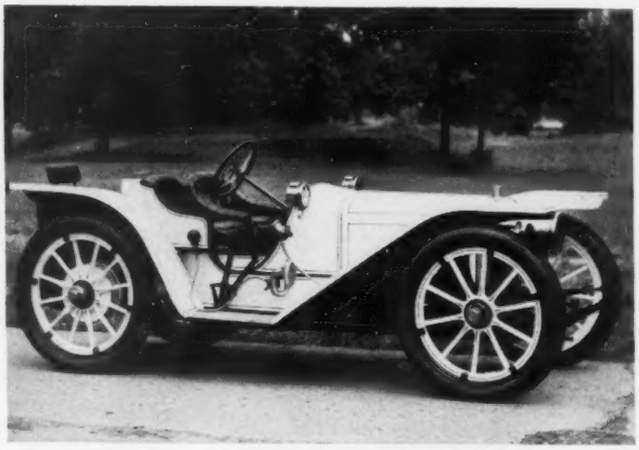
The race, forefather of the Memorial Day Classic, run off May 30, 1911, was won by Ray Harroun in a Marmon that, ironically enough, owed its design inspiration to Stutz. Harry's entry, bearing No. 10, made 10 pit stops for tires and finished 11th, just outside the money. But it covered the entire distance without a single mechanical adjustment, this in a grueling event that wiped out nearly half the 40 starters, all of them driving established makes. Stutz was well satisfied and Anderson allowed that the car had run "Real sweet!" In fact, he offered to drive it again in other races. It was the start of a partnership that brought in an ample share of the racing gravy. At Indy alone, 15 Stutzes competed in nine of the 500-Mile races between 1911 and 1930, with only four retirements. The score included two third places, an outright win by Tommy Milton in 1923, a sixth, a seventh and two tenth places.

Quick to cash in on the performance of his car, Harry accepted an offer by the Ideal Motor Company of Indianapolis to manufacture the prototype. On July 10, 1911, the Hoosier press announced: STUTZ BUSY PRODUCING RACING DUPLICATES, and soon after Stutz coined for his new creation a slogan that remained with it to the end: "The Car That Made Good in a Day."

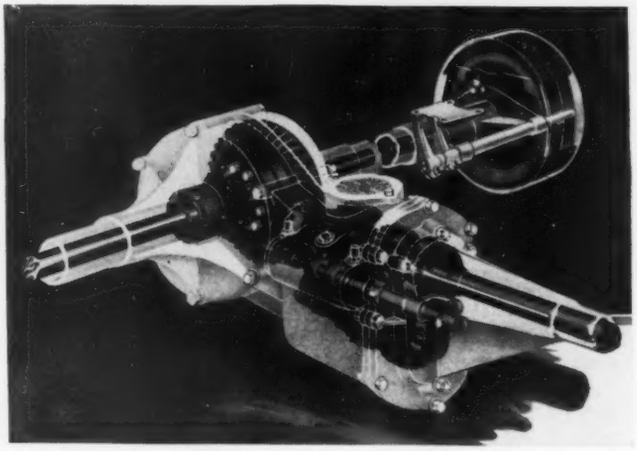
The production version had a 120-inch wheelbase, the "absolutely straight line drive" originally in the American Underslung, and a multiple disc clutch running in oil. For $2000, buyers had a choice of three body styles and three standard colors featuring vermilion, French gray and Stutz blue. The engine developed 50 bhp. Backed by $100,000 in fully subscribed stock and an able board of directors which included Henry Campbell, Stutz viewed the year 1912 with more confidence than most of the 47 new manufacturers about to embark on a simultaneous struggle for recognition. At the age of only 35, Harry was both chief engineer of Ideal and president of the Stutz Motor Car Parts Company, builders of his patented transmission.

Interestingly enough, two of the greatest designers in the history of the American automobile, Harry Stutz and Fred Duesenberg, were born within a year of each other: Harry in Ansonia, Ohio, September 12, 1876, and Fred at Lippe, Germany, December 6, 1877. Both spent their youth learning about farming, and while Stutz earned $1.75 a day building pump engines for farm use, Duesenberg repaired farm machinery. Neither had any specialized technical training, yet both were touched at birth by the elusive gift of mechanical genius. Both were obsessed by the idea of harnessing that genius to the design of automobiles; both, too, were relentless in the pursuit of success. In later years, Harry C. Stutz's favorite dictum was, "It *can* be done!" It was not surprising, therefore, that the two lived to become close friends. In fact, many years later, a decade or more after Harry severed all connection with the original Stutz company, the sensational 1931 Stutz DV32 — "first dual valve, double overhead camshaft principle in a stock car costing under $10,000" — featured a cylinder head so startlingly similar to that of the Model J Duesenberg that it was rumored Duesenberg had given Stutz the original blueprints for free.

Meantime, though 1914 unleashed the first World War, it also witnessed the birth of an American sports car whose name still commands admiration and respect the world over. It was the year in which the immortal Stutz Bearcat made its appearance. In its twilight, the Bearcat too often became

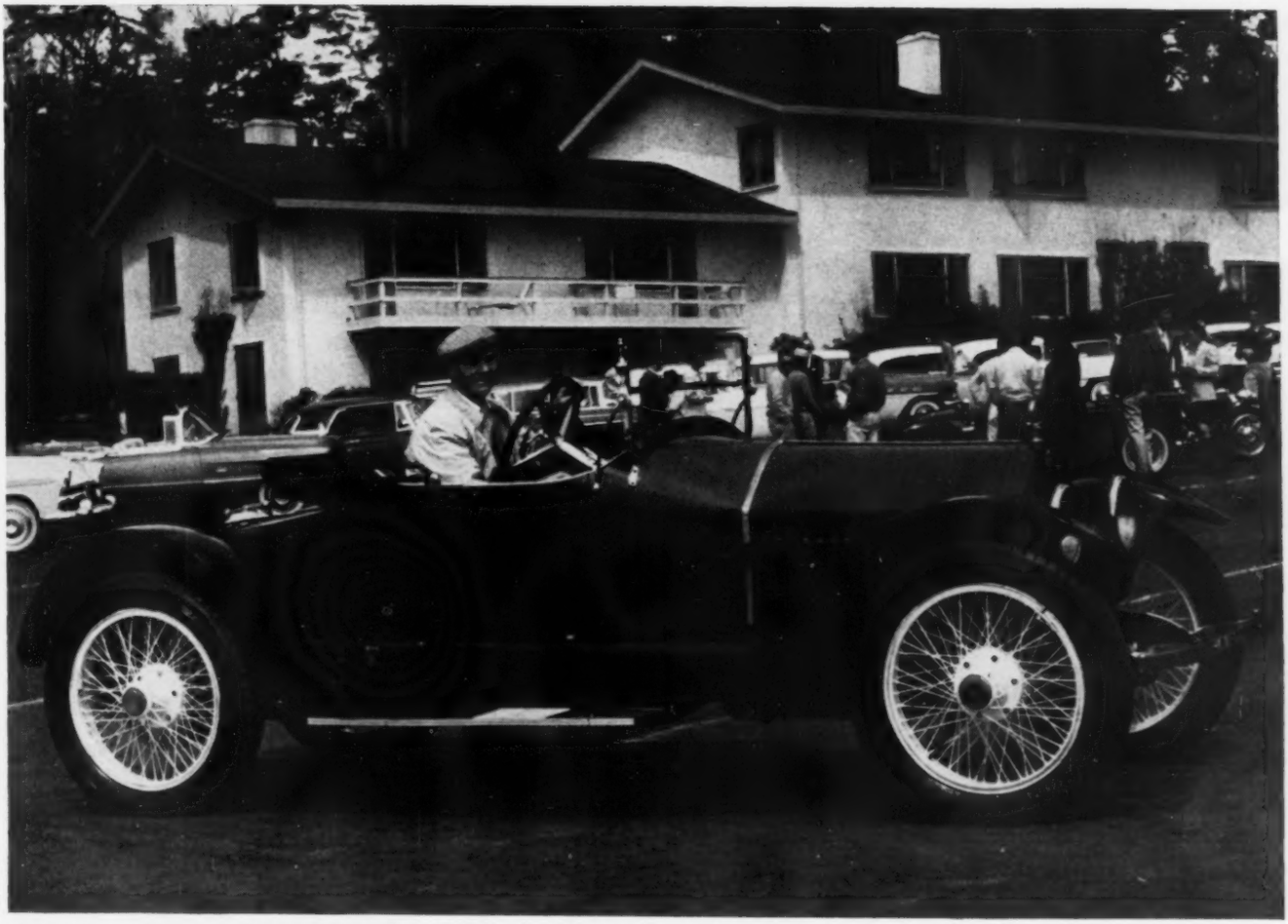


First car built by Harry Stutz, the 4-cylinder 1905 American Underslung introduced underslung principle, other innovations ahead of its time.



Youthful experience with Lindsay Russell axle company and Marion Motor Car Co. led to development of famed Stutz single-unit transmission.

associated with raccoon coats and wealthy, show-off college kids, but by then it had built up such a legendary reputation at the hands of real race drivers that nothing could dim its light. The Bearcat was the outstanding product of the 1914 Stutz line. Actually, one 120-inch chassis was offered, but with interchangeable four or six-cylinder, T-head engines which inspired the model names "E4" and "E6." Four body styles included a "racy creation known as the Bearcat," which seated two and was distinguished by a higher axle ratio. Thus, the Bearcat came with either a four or a six-cylinder engine. The latter version featured the proven T-head with outsize (2½-inch) valves with nickel-steel heads for better heat dissipation. Four main bearings of white bronze supported the forty-point carbon steel crankshaft; the cylinder block was cast in two pairs for



POTTER

1917 Stutz roadster, owned by Otto H. Teller of California, features a 4-cylinder engine, wire wheels, unique horizontally-mounted spare wheel.

greater rigidity; crankcase and pistons were of aluminum, the latter with four rings and oil grooves to help oil distribution to the cylinders. Spiral bevel timing gears lessened noise. Aluminum, by the way, cost roughly 75 percent less than it does today, but Stutz would have used it, even had it cost 75 percent more, simply because it best suited his purpose. The four-cylinder version developed 60 bhp at only 1500 rpm, and a feature common to both units was the enclosure of each pushrod and valve spring in a separate aluminum housing.

The Bearcat's chassis was superbly rugged. It retained the Stutz-designed combination of gearbox and differential, though with a cone clutch in place of the multiple-disc type. The entire 1914 range featured electric lights and a self-starter, but Harry evolved his own six-volt generator and starter motor and had them built by Remy. Both were totally enclosed and ran on ball bearings. The dual ignition system used a Splitdorf magneto, and soon the twin bucket seats, rear-mounted gas tank and center-lock wire wheels became the trademark of the Bearcat, along with two spare tires mounted outside.

In May of 1914, William D. Myers, sales manager for the Stutz company, walked excitedly into Harry's office. "I've news for you, Mr. Stutz. We're so far behind on orders that the last Stutz was sold yesterday. Dealers are having to beat off Bearcat customers. We've got to do something – but quick!"

Harry pushed back his familiar green eyeshade and a sly grin dawned on his face. "And I've got news for you, Bill. We've just bought the property at Tenth and Capitol. It's going to cost $100,000 to put up the new factory, but I think we can move in by September . . ."

"That's great," Myers agreed. "But what do we do right now?"

Stutz picked up a letter from a sheaf on his desk and handed it to him. "Dear Mr. Stutz," the letter said, "This is just to let you know that my Bearcat is wonderful. When you drive a Stutz you own the road!"

"It's a natural for a slogan," Harry said. "While letters like this keep coming in, we don't need to worry too much about competition. It'll take them longer than four months to catch up."

A year later, honors came thick and fast. A Stutz was chosen as the "Official Lincoln Highway Car," and made the opening trip from Times Square, New York, to Lincoln Park, overlooking San Francisco's Golden Gate. A six-cylinder, six-passenger Bearcat touring car covered the entire highway, putting up signs and mapping the route. Since the new road consisted mainly of gravel and dirt, bearing no resemblance to today's paved supersurface, Stutz ruggedness was in its element.

The Car That Made Good in a Day had indeed come into its own, but what Harry regarded as the highest act of recognition came from the New York Evening Journal on October 19, 1915, when a cartoon appeared showing Uncle Sam with a Stutz under each arm. The caption read: "They are Good Enough for Me!"

Though he never raced, Stutz was a topnotch driver with lightning reflexes and a natural "feel" for automobiles. For kicks, he perfected a seemingly hazardous trick of powersliding into parking spaces on rainy days. This impressive maneuver saved wheelwork, reversing and time, and apparently Harry never missed. In one deft swoop he could dovetail his car with a quick (*Continued on page 76*)

C/D's CON

With something old, something new, something borrowed, something blue, the 1961 Concours

Long-time auto enthusiast Dave Garroway spent a half-hour taping his television show at the Concours. Here he's shown with Ken Purdy's magnificent maroon 1934 Type 50 S Bugatti coupe, a chopped-top, supercharged three-seater that won the Classic category's best in class trophy, seen standing next to its left wheel.

Sputtering out of the past, this Morgan three-wheeler, circa 1935, attracted widespread comment. Its co-owners Noel Thompson and Richard Schneider also entered a '25 Lancia Lambda. C/D tried with its 24 Concours cars to represent the whole spectrum of car design from the very, very early types to the latest contemporary models.

PHOTOGRAPHY: DOLIN

Brought together and photographed for the first time in this country are, from left to right, the Jaguar XK-E, a hit of the show; the former Ecurie Ecosse D-Type owned by James Munro of Akron, Ohio and the gleaming red C-Type owned by Jeff Scott, of New York City. The evolution of the new 150-mph, 3.8-liter coupe is clearly obvious, dating from the 1951 Le Mans-winning Cs and on through the D stage. We tried to get an XKSS to complete the suit.

COURS

was a marriage between auto collectors and car buffs with Car and Driver acting as best man.

► Almost 400,000 persons flocked to the New York Coliseum to visit the International Automobile Show and the CAR AND DRIVER Concours D'Elegance, the latter witnessed by uncounted thousands more when it was featured on Dave Garroway's "Today" show on NBC-TV.

There were four categories: Competition, Antique, Classic and Sports. Among the Competition contenders were an evilly black '38 Maserati 8CTF single-seater owned by Robert Haumaier, of Scarsdale, New York; Luigi Chinetti's four-cam 4.1 liter Ferrari, a fuel injection Corvette owned by Edward DiBasio, of Cambridge, Massachusetts, and a consistent campaigner, the '32 Type 51 Bugatti entered by Grand Prix Engineering, Norwalk, Connecticut.

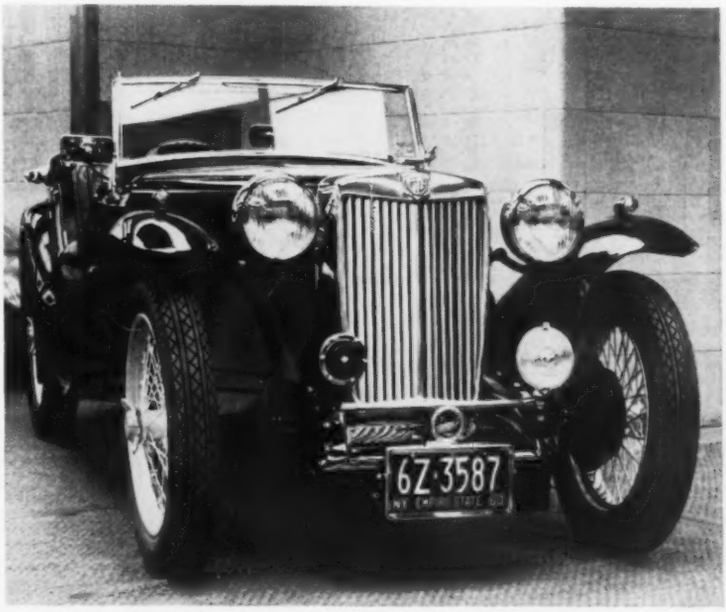
The Antique class saw the buggy-like '10 Baker Electric owned by Sherwin Hirschhorn, of Wayne, New Jersey, walk off with top honors. But the remainder of the field was similarly interesting, including a metallic blue '25 Lancia owned by Noel Thompson and Richard Schneider, of Roseland, New Jersey, and a '12 Moon Raceabout and '11 Model T Ford Town Car entered by Henry Austin Clark of the Long Island Automotive Museum.

Fierce competition marked the Classic entries which included a '37 Phantom III Rolls owned by Hugh Pierce, of Scarsdale, New York; a '32 Auburn Speedster owned by George Pavlisko, of New Brunswick, New Jersey; another Auburn Speedster, this one a '35 owned by John Corigliano, of Nutley, New Jersey; a big, blue and black Lincoln Dietrich Victoria owned by Ralph Tanner, of Montclair, New Jersey; a '37 Cord Phaeton owned by John Longo, of Brooklyn, New York and an immaculate white '41 Lincoln Continental owned by William E. Caldwell, Jr., of Larchmont, New York.

Always a popular class, the Sports category included a now-extinct two-seat '57 T-Bird of Phillip Callahan, of Forest Hills, New York; a Touring-bodied '57 Aston Martin roadster owned by Helen Cherubini, of Center Moriches, New York; the unique '57 BMW "Gunsight" coupe created by designer Raymond Loewy and a flashy red '39 Alfa 2900 B owned by Leonard Potter of the Vintage Car Store of West Nyack, New York.

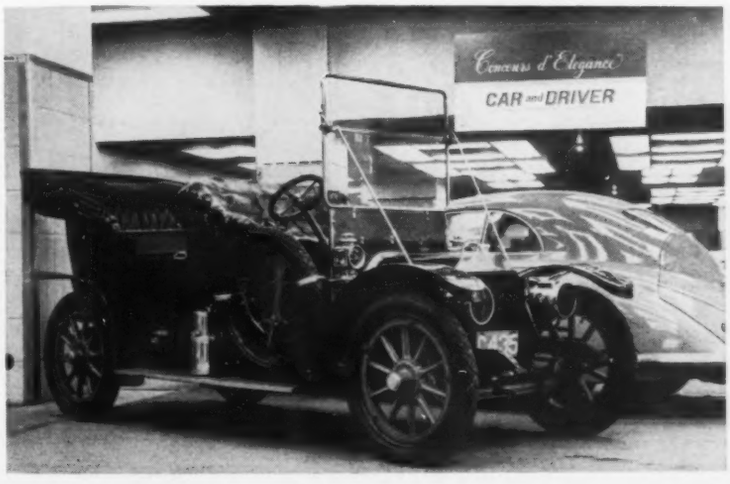
We regret we can show only a small sample of the gorgeous automachinery C/D had on display. Next year make it a point to see it in person!

—C/D



This MG TC, owned by Fred Rosvold of Rockville Centre, New York, is not the one on the cover of this issue of C/D. Fred's car, which earned the trophy in the Sports class, is equally well-prepared, though. It's painted a gleaming black with the undersides of the fenders and the frame painted fire-engine red. He and his wife restored this classic sports car to its present look of right-off-the-boat freshness.

The oldest car at the show was this snazzy '08 Lancia owned by David Tunick of Greenwich, Connecticut. In addition to this honor, it's believed to be the oldest Lancia in the United States and the second oldest of the make in the world. Its flawless deep red paint graces an original American-built body. All the leather is original too.



ROAD TEST: FIAT ABARTH 1000

Continued from page 26

and with a willing, high-revving roar that shouts power and speed. And it delivers its noisy promise. The familiar zero to 60 mph touchstone is answered in eight-and-a-fraction seconds. This is excellent production car time today and a few years ago was unheard of for anything short of a big modified car.

The rocketing acceleration comes from 91 bhp (CUNA) — a 50 percent jump over the 750 — with the peak at 7100 rpm. Torque hits its top at 5500 rpm with 77 lb-ft. A test weight well under 1700 pounds and a low drag body are the other factors involved. Remarkably, the gearing of these two test cars was the long-legged Sebring ratio. Several gearbox and final drive options guarantee even better acceleration readings. These options are of distinct interest to American drivers because of the nature of our circuits. The test cars, as the graph makes clear, offer anything but close ratio gearing.

The standing quarter-mile in about 15 seconds gives some idea of the potency of the 1000 even with this gearing. What lies in the realm of possibility through juggling the options tempts the imagination.

Handling manners of the car are in the same outstanding class as its straight-line performance with the reservation that the accelerative ability on tap under foot speeds up two things: the experienced driver laps faster and the inexperienced one gets into trouble quicker. Slight oversteer is all we would grant in analyzing the 1000's cornering personality. The unfamiliar driver is apt to be on the power too soon or too late, miss the right cornering posture and come into the pits commenting that "the back end is twitchy." When it does let go, the rear end wants to swap with the front just like a Porsche and for the same reason. With Michelin X tires, there is little warning. Facing this, the neophyte lets up on the accelerator and around she goes. Summing up, it's very controllable in a high speed cornering attitude, but sensitive.

Braking is now up to the car's other capabilities. Reading a true 118 mph at the end of Meadowdale's long straight, you can take it right to the 200-foot marker before jumping on the pedal.

The gearbox is that wonderful Fiat 600 unit that must have been designed by engineers who spent their spare time on the Mille Miglia. "I know it seems ridiculous," Owen says, "but more than anything else it reminds me of the Corvette's. After the non-synchro first, it's just like the Corvette: very short throws and no need to pause."

A prognosis on the overall competition future of the Fiat Abarth 1000 holds both certainties and uncertainties. In the F.I.A. G.T. Class 6 for which it is designed, it should find no equal. In the American G.T. racing (e.g., SCCA's production category), the car is probably going to find the long courses a chore as it tries to beat the bigger-engined Ace-Bristols, Jaguars, Daimlers and Porsche Super 90s in its class. On cornering it will be so superior that, given a wet course, it may break up the big cars even on those circuits with long straights. On the shorter courses, we would stagger out to the end of a limb with George Owen and say, "If you can't win trophies with this, you can't win them with anything."

Since the introduction of the Abarth 750 Bialbero, this family line has had the reputation of being a plug-burning, plug-fouling, jet-clogging obscenity in street or highway driving. It wasn't true of the 750 and it isn't true of the 1000. While it is certain that in a race you would never want to let it drop below 4500 rpm for optimum performance, there is excellent power available in all gears from 3000 rpm up, a characteristic shared with many other highly-tuned but tractable production sports cars. You can, and we did, punch it at 3500 rpm in fourth gear and feel a real smack in the back. It will putter around city streets hunting for an entrance to the expressway at 40 mph in top gear while showing 2300 rpm. One of the things of which Abarth is proudest is that his cars will idle right down to a whisper. With warmish street plugs, the 1000 Bialbero will tick over at 800 rpm and pull away cleanly. It never loaded up in several dozen miles of city driving with competition jets in the Webers. At trackside, the single change to cold plugs puts it in racing trim, ready to charge off cleanly and happily to its 7500 rpm shift points.

—Dic Van der Feen

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FORD INTERNATIONAL: BLUEPRINT FOR TOMORROW?

Continued from page 50

Anglia (now the Popular) just held its own against the Morris Minor, though Dagenham introduced a new Anglia-Prefect and the now extinct Popular, selling for a basic $770, in the fall of 1953.

The upshot was that for 1953 to 1955 Ford's share of car production stayed around 27 percent of the British total, while BMC recovered from 35 percent to 39 percent. Ford had raised its market sharply since early post-war years, but mainly at the expense of small independent car makers.

But in the following years Ford went ahead. The end of the post-war car scarcity helped Ford, and there were major gains following the merger with Briggs Motor Bodies in 1953, but the main reason for Ford's success was its new medium-sized models introduced in 1956. Both the Consul and Zephyr were enlarged and drastically restyled, and their engine sizes raised from 1½ to 1¾ liters and from 2¼ to 2½ liters respectively. The new Anglia in late 1959 brought a major breakthrough and from 1960 Ford estimated its share of car sales at 28.9 percent, a new high level for the post-war market. One sure sign of success is that Ford's unit profit, per vehicle and per employe, has been well above BMC's.

Thanks to help from Dearborn, Ford of England has built up a sales and service organization which leaves its competitors far behind. Ford's production has also been helped by Henry Ford I's forsight in moving to Dagenham (Perry wanted to go to Southampton) where it covers a near 600-acre site, operating its own blast furnace and making its own gas and electricity.

While thinking of English Ford as a car producer, it's worth recalling that it made 95,000 panel and heavy-duty trucks during 1960, one out of every four in Britain. British Ford, with Massey Ferguson, also dominates the British tractor business. Since 1957, Ford has been making light as well as heavy tractors and last year claimed 38 percent of total British output.

This was Ford's position in Europe when Henry Ford II decided to turn Ford into a world-integrated company, free from national minority ownership. Hard economic logic showed that the number of cars in use in the United States grew by only 23 percent between 1954 and 1959; for Germany the growth was 167 percent, for Italy 121 percent and for Britain 61 percent.

Consumer demand was drawing together the various parts of the Ford empire. American car buyers had shown their liking for small Fords made in Europe—mainly at Dagenham, where 45 percent of the profits went to British investors. Ford of Dagenham had major cost advantages over its American parent, and in early 1960 Dearborn showed that it was alive to world cost comparisons by ordering leaf springs for the new Falcon from a British firm. It

(Continued on page 70)

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(Continued from page 69)

also bought steering wheels, clutch release bearings and electrical wiring in Britain.

Lastly, Ford's bid decision was hastened by the economic integration moves in Europe, featuring the formation of the Common Market—including Germany, France and Italy but not Britain—with a population almost equal to that of the United States (see SCI, February, 1960).

Over the past ten years, expansion in Europe's economy has far outpaced the United States', with car production alone increasing 250 percent, from less than 2 million in 1952 to over 5 million in 1959. This growth was not confined to cars: I.B.M. and Timken Roller Bearing recently bought complete control of their British associates to be able to take advantage of European expansion, while all leading American aluminum producers, Alcoa, Reynolds and Kaiser, have formed links with British companies.

Lurking in the background, according to British financial commentators, was the Department of Justice. The lawyers, it was said, would declare an agreement between an American parent company and a *partly-owned* foreign subsidiary as being in restraint of trade. This raises the question of the agreements between Dearborn and Dagenham. British Ford has exported freely to the United States, though recently its medium-sized models have suffered from competition of the U.S. compacts. If U.S. Ford plans to produce a really small car, a firm market-sharing agreement with Dagenham, it was said, would be needed; to write such an agreement Dagenham would have to be wholly-owned by Dearborn.

A few weeks after Ford announced its takeover bid, J. M. A. Smith, assistant managing director of English Ford, was outlining the industry's expansion prospects for the coming 15 years. He predicted Britain's car population at 13½ million by 1975, compared to 5¼ million now. This would imply home sales of at least 1.3 million and, allowing for exports, would raise total car output to 2 to 2¼ million against 1.3 million in 1960.

This prospective growth rate of 4 to 4½ percent a year shows the magnet for Dearborn, added to the strong probability that Ford will be able to enlarge its share of the total market. Second attraction for Dearborn is that English Ford, like the industry as a whole, will be able to meet this target without any major additions to capacity once current plans are complete. Ford's current car capacity is probably 400,000 to 450,000 units a year; the Liverpool factory will add at least another 200,000, with further extensions planned at Dagenham. This means that Dearborn should not have to put up any large funds for expansion: the British company's $195 million development plan is covered by cash and securities of $210 million, aside from the benefits of future cash flow.

Earlier we mentioned a second hypothesis concerning results of U.S. Ford's takeover of English Ford. It's this: components for the Cardinal may be expected to be produced in an expanded German Ford factory, possibly with the Taunus restyled into the Cardinal with English Ford's Anglia and Dearborn's product forming two other makes.

Dissenters would argue that you should put yourself in Henry Ford II's position in late 1960. He had two problems, first to supply the European market within and outside the Common Market as economically as possible and second, to ensure that know-how and possibly also components would be available for Ford's new small car in the United States. In bidding for British Ford, Henry II decided in effect that Cologne would supply the Common Market, possibly helped by Dagenham, but that Ford of Britain would sell to all other markets including supplies to the United States.

Why couldn't German Ford make the complete new small car, the Cardinal? To begin with, German Ford is a small producer (it sold only 108,000 cars in 1959) with a total output rated at not much over 200,000 in 1960. The bulk of German Ford's production centers on the 12M Taunus, a popular small car, and the 17M, whose new model looks strikingly like the Falcon and is competing with Opel's 1700 Rekord. To have made the entire Cardinal would have meant a major expansion in capacity as well as dropping one of the existing models—a move which would have given a clear market opening to Opel, already nearly twice as large as German Ford. Time also ruled out production in Germany. In late 1960 Cologne estimated it would take at least two years to make the Cardinal there. Originally, it is said, U.S. Ford offered to lend Cologne $115 million to build a new plant, and the German company was to employ 3,000 more workers (present payroll is 20,000) on a new engine factory. This would probably have been the first step towards making the Cardinal. But now only about 1,000 more are to be employed in a new extension of the Cologne factory, and it's quite possible they will work on certain Cardinal components.

Dagenham, by contrast, would appear much better placed. It's a big group by European standards, selling 383,000 cars in 1960, when British car output was held down by credit restrictions. On top of this Ford's new Anglia, introduced in September, 1959, proved an outstanding success. Despite its lines, which resemble Germany's DKW or Holland's DAF more than the traditional British small car, and despite high gearing which is rare in Britain, the new Anglia proved a winner right from the start. This success, some claim, should have convinced Henry Ford II that this light car design could serve as the basis for Dearborn's own model, even if it meant importing components from Britain.

What are the short-term model plans of Ford of England and Ford of Cologne? It appears German Ford will keep the new 17M in production for some time yet, while the 12M is selling too well for any change soon. Ford of Britain, however, has big new plans afoot. The Prefect III, introduced in late 1959 shortly after the Anglia, is a stop-gap model, with the old sedan body and the new Anglia engine and transmission. This is soon to be replaced, probably by a somewhat larger family sedan priced slightly higher but with a livelier

sports-sedan performance. This may rival the Victor, made in Britain by the Vauxhall side of General Motors, and the Hillman, made by Rootes, as an attractive medium-light car. The next major change, slated for this fall, will be to replace Ford's two medium-sized sedans, the 1¾-liter Consul and the 2½-liter Zephyr. Both of these models go back to early 1956, though they had a major face-lift in February 1959. Current ideas on the replacements are pretty vague, but observers believe that styling will become much sleeker while the major technical innovation will be the use of a four-speed gearbox. The Zephyr is expected to appear with a 2¾ to 3-liter engine and with disc brakes as standard equipment.

The new medium-sized models will be aimed primarily at the British market, still one of the biggest in the world outside the United States, and at the sterling area and parts of Europe. There may also be some interchange of design and possibly components between Britain and Germany on the newly-introduced 17M and the forthcoming Zephyr.

Just when are Ford of England's plans likely to be complete? The rough answer is in about two years. Ford of England is now carrying through a $195 million development plan, with half the total to be spent on a 200,000-a-year car plant near Liverpool. Sir Patrick Hennessy fought Britain's Board of Trade over the move, for Ford wanted to expand at Dagenham to help supply the fast-growing European market. But Liverpool, home of the Cunarders in north-west Britain, is the ideal shipping port for the United States. London commentators believe that Ford may have made a virtue of necessity and will use its Liverpool plant to supply North America. What is certain is that initially Halewood will cover all operations from stamping to final assembly, later becoming a fully integrated car factory with a capacity increase already in the cards.

The big unsolved question, on which Ford is keeping a tight security silence, remains the design of the new Cardinal. Planned to push all European cars even further out of the American market, the Cardinal will owe a good deal to the Anglia, whose success is said to have left a deep impression at Dearborn. It's said that Ford has rejected a rear-engined model, and will use the Anglia four-cylinder engine, possibly incorporating aluminum and probably including slide-out facilities for easy maintenance. The sedan will probably be two-door rather than four-door, to reduce body noise in the small car; the two-door VW has held its own against the four-door Dauphine. Styling, by contrast with specifications, will probably be nearer the German 12M Ford than the Anglia. In Britain it is believed that the styling of the Anglia has been deliberately restrained to meet the conservative British car market.

Ford's Cardinal, wherever it is produced, stands to be a major threat to European firms now exporting small cars to the United States — VW, Renault, Fiat — and a later sales drive in Europe itself is not ruled out. Success for the Cardinal would be a striking first justification for the Ford take-over. —*HAV*

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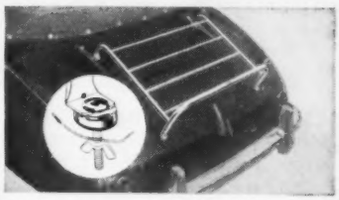

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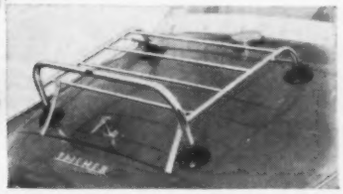

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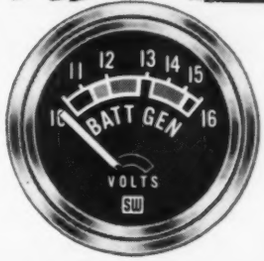

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FERRARI F.1/61-120°

Continued from page 58

DESIGNING THE WIDE-ANGLE V6

At Monza time, Chiti had already made substantial progress with his new 120-degree V6 engine for the 1961 season. There were several good reasons for switching to the low, wide layout at this time. The 120-degree configuration provides one of the best balance conditions for the V6, as Roger Huntington pointed out in last May's C/D, so Chiti could expect slightly higher engine speeds for the same reliability. If the balance is so good, why wasn't the 120-degree layout used earlier? Simply because it wouldn't fit in the space between the front wheels; it would have been impossible to provide sufficient steering lock for a G.P. car. Rear engine mounting makes it possible, even desirable, to use wide or opposed engine layouts. In this case the wide angle also supplies a lot more room for carburetors or injection and straight intake passages than Chiti could ever have found for the 65-degree Dino engine.

A new engine was also worthwhile because the Dino powerplant was bigger and heavier than it needed to be to handle 1½-liter chores. After all, it's been used as a reliable 2½-liter G.P. engine and has given excellent dyno results (310 bhp at 7500 rpm with a fine torque curve) as a 2925 cc engine for sports use or the Intercontinental Formula. In 156 Dino trim its weight is quoted at 320 pounds. The new unit was designed strictly as a 1500 cc engine, right to the bone for that size, so it weighs 55 pounds less: 265 pounds. This gives Chiti an additional margin to work with in staying down at the G.P. minimum weight.

How is an engine's weight reduced? In this case the operation included shortening the connecting rod, compared to the Dino, and reducing the diameter of the big-end bearing. The rods are still machined from large, very rough forging blanks, and have conventional two-bolt big ends. The wide-angle layout allowed substantial simplification of the crankshaft design, and thus a reduction in weight of that major component. No major change was made in the simple, deep-sided construction of the crankcase, which terminates in a very wide finned oil pan that's so shallow as to be little more than a cover plate. The pressure and scavenge oil pumps are driven from the front of the crankshaft, and a disposable-type oil filter — new on racing Ferraris — is placed vertically at the front of the engine. As on the Dino, the main oil gallery runs down the center of the vee to passages to the heads at the back of the block.

ALTERED OFFSET AND SIMPLIFICATION

There's one unexpected difference between the Dino and 120-degree engines: the cylinder bank offset has been transposed. Like the Lancia and G.M. V6s, the Dino engine has its left-hand bank offset ahead of the right bank. Possibly to bring his new engine into line with the layout used on all V12 Ferraris, Chiti shifted its right bank forward. There can be no profound technical reason for this; it's just a matter of consistency and possibly of the arrangement of engine auxiliaries.

Simplification, based on experience with the Dino, shows up often. Each cylinder head gets along with eight hold-down studs instead of the twelve the Dino used. Chain drive to the camshafts is still used, but between the cam sprockets the chain now runs straight across — as on the Lancia V8 or Alfa Giulietta — instead of being pulled down around an additional idler sprocket. Each bank has its own double-roller chain system, driven from two half-speed gears at the nose of the crankshaft. Through spiral pinions, these gears also drive the twin distributors splayed out at 120 degrees in front of the block. On its tension side, between drive and intake cam sprockets, the right-hand chain passes over an additional sprocket that's going unused right now but is ideally placed — it even has a proper access plate — to drive a fuel injection pump placed within the cylinder vee. For the time being Weber carbs are being used, a highly experimental new design with three throttle bodies cast in one unit.

Beginning Next Month:

BEAUTIFUL BRUTE

The Biography of Chrysler's 300

For seven years the 300, produced in calculated handfuls, has stood for all that's potent and luxurious in American cars. The background of the 300 has been researched in depth by Bill Carroll, with the cooperation of Chrysler Engineering, uncovering a wealth of unpublished information. Part 1 next month, the first of three installments, covers the Cunningham era and details the special Indy engines that pulled 372 horsepower from 271 cubic inches of Chrysler V8.

ON SALE: JULY 6

Though the cylinder head's structure is much simpler, its internal mechanism is a straight carryover from the Dino. The wide cam lobes still attack broad mushroom tappets of the Jano design that screw directly onto the valve stem for guidance and clearance adjustment, and coil valve springs are still employed. Chiti has, however, departed from the Dino practice of machining both cam housings in the same plane, returning to the technique of making the cut at right angles to the respective valve stems. Valve inclination is modest, being 28 degrees from the vertical for the intakes and 32 degrees for the exhausts, giving a total included angle of 60 degrees. This is also the same as the Dino.

EFFECTS OF VALVE DIAMETERS

Only one exhaust valve size is used in this engine — 34 mm — but two different intake valve diameters will be available to produce different power curves as desired: 38.5 mm and 42 mm. To put these in perspective, and also to show some of the

changes that have been rung on the popular 250 cc cylinder size in the past, this table has been prepared:

Engine	Dimensions	Valve Sizes Intake	Exhaust
NSU Special	66 x 72 mm	39 mm	37 mm
Küchen V8	68 x 68 mm	38 mm	35 mm
Guzzi Twin	70 x 64 mm	38.5 mm	33 mm
BMW 253	72 x 66 mm	40 mm	36 mm
Ferrari 120°	73 x 58.8 mm	38.5 mm	34 mm
Ferrari 120°	73 x 58.8 mm	42 mm	34 mm

Certainly one advantage of working with a six in 1½-liter size is the vast amount of experience that has been gained with the 250 cc cylinder, both in cars and cycles.

Let's look at the gas velocities that will follow from the Ferrari's very large intake valves. Using the parameters of 195 and 260 feet per second gas speed for peak torque and peak power respectively, we come up with engine speeds of 7200 and 9600 rpm for the smaller valve and 8700 and 11,600 rpm for the bigger 42 mm valve. Since the engine's quoted power peak is at 9500 rpm, it's clear that the smaller valve is tailored to match that peak and to provide good torque, while the larger valve is intended to hoist the power curve at the top end at the expense of the rest of the speed range. Both valve sizes will be available for both 65-degree and 120-degree engines, and the power outputs expected by the factory – irrespective of engine angle – range from 160 to 170 bhp for the smaller valve and from 180 to 190 bhp for the larger one. If the wide-angle engine is able to develop more power (Ferrari quotes 190 against 180 for the 65-degree unit) it's because its better balance allows it to rev slightly higher: 10,000 rpm red-line against 9500 rpm, or an increase from 4080 to 4300 feet per minute of corrected piston speed.

These outputs are impressive but not inconsistent with what the 65-degree engine was delivering in 1960. The two 1½-liter units used at Modena last October developed 172 and 177 bhp, and the level of 167-168 bhp has often been accurately quoted. The latest dimensions of the V6 give it a piston area of 39 square inches, which is handsome for a simple engine of that size. Reliability isn't established yet, of course, but by late March the first wide-angle engine had completed 50 hours of dynamometer testing without a single snag, performing smoothly right off the drawing board. You can't do better than that.

UNIQUE DRIVE LAYOUT

One of the most unusual components in the rear-engined Ferrari is its gearbox and final drive assembly. Though it looks at a glance like those of other rear-engined machines, in that the gearbox is placed behind the rear wheel centerline, its shaft layout is drastically different. Instead of being placed in unit with the engine, the multiple-disc clutch is carried out in the air at the back of the box, driven by a pair of gears from a long shaft that extends from the engine underneath the gearbox. This keeps the clutch out in the open where it's well-ventilated (Ferrari has suffered many failures with the completely enclosed clutch of the Lancia/Dino designs) and makes it easy to affix the re-

(Continued on page 74)

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(Continued from page 73)

quired ring gear and starter. Even more important, it allows the engine to be placed as low in the chassis as its very shallow dry sump will permit. In this case this is several inches lower than would be possible if the clutch and starter gear were conventionally mounted at the back of the crankshaft.

The drive line features other subtleties. The long drive shaft to the clutch is definitely not intended to act as a torsion bar to absorb torque pulsations. This function — which Chiti regards as important — is performed in a more controlled manner by a big coupling which contains eight rubber elements that are under compression when the engine is pulling the car. Located where a clutch would ordinarily be, this coupling is within a cast forward extension from the gearbox that actually places the engine some seven inches farther ahead of the rear wheels than it mechanically has to be. This apparently provides correct weight distribution and also leaves room for the longer Intercontinental Formula engine.

The gear train up to the clutch from the engine shaft is readily changed, to switch the overall gear ratio, by removing the entire clutch and back cover plate complete with its built-in hydraulic clutch withdrawal caliper. These two gears are laid out so that the ratio they provide will never be higher than 1 to one, and most often will be a reduction of between unity and 2 to one, so the clutch — and the attached input shaft to the gearbox — will usually be running at less than engine speed. The primary or input shaft of the all-indirect gearbox is placed to the right and slightly below the centerline of the secondary or output shaft, which directly drives the spiral bevel final drive gears. The box houses five constant-mesh forward speeds (six have been tried experimentally) without synchromesh, and has its own pressure lubrication system.

VESTIGIAL ANTI-ROLL BARS

For the first time on a Ferrari, the brakes are mounted inboard at the back. They're Dunlop discs (as outboard at the front) of racing pattern, at the rear without the radial drilling or grooving of the disc used on earlier Ferraris. The rear half-shafts have two Hooke-type universal joints apiece and, near their inner ends, have the very smooth but very expensive ball-type sliding splines. The rear hubs are carried by simple hollow suspension posts, cast in light alloy.

When the rear-engined car first appeared it had tubular rear suspension wishbones but kept the beautiful forged wishbones in the front. On the 1961 car these too have been supplanted by simple welded-up tubular parts, mounted at the new angles discussed earlier. Ball joints are still used at the outer pivots, but the forged vertical suspension post has been completely redesigned to incorporate added stiffness and a better attachment method for the rearward-facing steering arm. The rear suspension wishbones are highly adjustable, both in length and in the location of their inner pivots, to allow further experimentation.

On the first rear-engined car Chiti adopted the neat Cooper method of mounting the front anti-roll bar within a transverse frame tube, connecting it to the suspension through splines, trailing levers, and vertical links. For 1961 the trailing levers, still beautifully machined and drilled, have been made about 1½ times as long as last year. This has the effect of decreasing the roll stiffness, assuming the use of the same size anti-roll bar, or of enhancing the sensitivity of adjustment the bar provides. An anti-roll bar has also been fitted at the back of the 1961 chassis, but its center diameter is very small and its effect thus minimal. Opinion at the factory is that all the anti-roll bars have been rendered vestigial by the new car's low center of gravity and the latest suspension geometries, so 1961 may see the bars vanish from this chassis.

JUSTIFIED CONFIDENCE

Ferrari's rack and pinion steering gear is included in the bundle of machinery at the driver's feet, which also have to make room for a 12-volt battery with a small booster cell attached. A transverse-placed steering damper is actuated by the left end of the steering rack. Just behind the radiator is the engine oil reservoir, so close behind, in fact, that the flow of hot air away from the back of the radiator must be severely impeded. Core of the radiator is once again in three sections, the sides for water and the center for engine oil. The new double-nostril nose was not adopted for reasons of style or intake ducting, but rather because wind tunnel tests showed that it provided better penetration than a conventional single scoop. In spite of the wider engine the body has been made narrower than last year's, mainly by indenting the inner surfaces of the two fuel tanks so they nestle more closely to the frame tubes.

This student of the fine art of Ferraris has been pleasantly surprised by the quality and quantity of information that the factory has been willing to release to CAR AND DRIVER on this exciting new Grand Prix contender. This early in any other season we'd be pleased to have photos of the outside of the car, let alone this kind of internal detail. To present a new racing car this way you must have vast confidence in it; obviously Enzo Ferrari feels Chiti and his men did well last winter. It's certainly too early to say, but with the potent engine and highly developed chassis of this car, we feel this confidence is not misplaced. —*KEL*

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THE ENZO FERRARI OF OKIE FLATS

Continued from page 23

business is anybody's guess. Be that as it may, Bill's account of his first trip overseas should be put on television except that it would result in more lawsuits than you could shake a summons at, his unerring eye for the ridiculous and sense of timing causing me to recommend a trip to see him perform.

Sooner or later the clash between two strong personalities, the difficult sale of the very pleasant Siatas, and Ernie's sometimes bizarre ways of doing business caused a breakup of the agreement and Devin went out on his own again, acquiring, among other things, the ex-George Moffett Osca, an Arnolt-Bristol, various Porsches, Ferraris, and finally one of the Le Mans DB "elephant" tanks which later went to Frank Manley and Stan Mullin. This last car set him thinking about how inefficient some European constructors really were on matters of weight, delivery, power output, and disregard of the customer as applied to California conditions and delivering himself of his now famous Devin's Law ("a second-class something is better than a first-class nothing") set up to capture the legions of those who were tired of being diddled at long range and/or whose cars or parts had been on the water for the last twelvemonth. Accordingly he made a quick study of fiberglass techniques, copped a quick mold off the DB, and started constructing Panhard-powered projectiles which from the first were very successful in the hands of Jim Orr and J. P. Kunstle, among others, the former taking the National SCCA class championship in 1956 and the latter causing great havoc on the Coast among much bigger cars with his blown model.

The Panhard parts problem apparently began to get difficult so Bill cornered all he could (he still has a very large stock of bits) and then with an eye to all the special-builders constructing aesthetic horrors like Ken Miles's Shingle, lifted a mold from Jim Orr's Ermini 1100 and, moving out of the high-rent district to Lancaster, started to tailor this A-1 Italian beauty to various sizes of chassis such as Triumph, MG, and loving-hands-a-home, ringing the changes by cutting sections out or building up panels with chicken wire and plaster.

He gradually got into the accessory business as a means of protection against high prices and fluffed-off delivery dates, developing such interesting objects as a special de Dion housing to take the Chevrolet Positraction rear end. As a natural extension of this, in 1956 he began to offer the Chevrolet-powered SS in kit form, mostly taking reworked Ford parts such as a narrowed solid front axle (certainly cheaper, and proven feasible by the success of Stroppe's Kurtis), rear ditto, '40-Ford pedal assembly, springs, gearbox, and Lincoln brakes tacked on to his own frame and body. However one day a bloke named Malcolm MacGregor wrote from Belfast,

(*Continued on page 77*)

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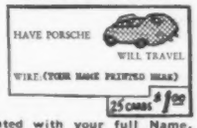

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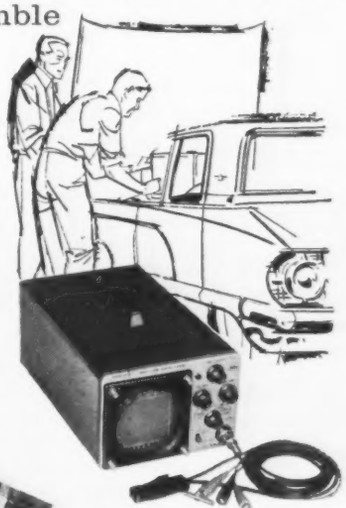

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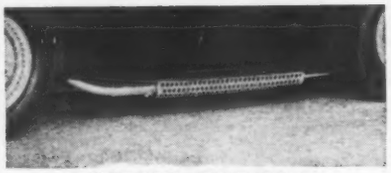

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THE CAR THAT MADE GOOD IN A DAY

Continued from page 65

flick of the wrist into any space big enough to hold it, coming to a neat stop parallel with the curb.

Company earnings reached a peak of $800,000 during 1916, the "second epoch of Stutz progress," when the Stutz Motor Car Company of America was formed to take over the Stutz Motor Car Company of Indiana, following refinancing to permit further expansion. Then came another Stutz bombshell, a sixteen-valve, four-cylinder, T-head engine, never before put into production in the United States. "Acceleration,'" raved THE AUTOMOBILE, "is comparable in smoothness with an eight or a twelve. The stock car will easily attain 75 mph." Many features of this model were borrowed from the Bearcat, which was continued by popular demand.

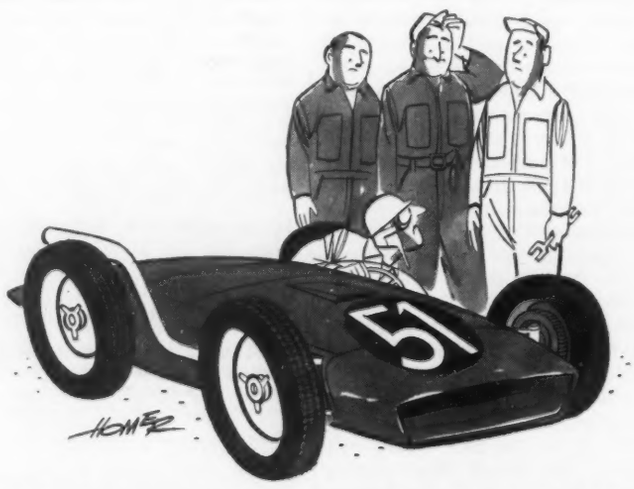
Within two years, the Stutz plant occupied an entire city block of 400,000 sq. ft. at the Tenth and Capitol site, and production began catching up with orders. Suddenly, in 1919, Harry Stutz decided to sell out to a financial group headed by Alan A. Ryan, vice-president of the company since 1916. Ryan, a skilful operator whose only legacy from a $500,000 paternal fortune had been a pair of gold cuff links, kept buying every available Stutz share on the market until he forced the price up to $724 a share. Harry felt the time had come to get out and start a new company of his own.

The HCS Motor Car Company followed, which built both passenger cars and taxicabs, but this was not a success and the first model cost nearly three times as much as the original $1000 target. Though there were plenty of orders, the constantly rising costs of labor and raw materials offset profits, and by 1926 Harry decided to quit the industry for good, leaving behind him the cleanest-looking six-cylinder engine ever designed until then.

The original Stutz Company, which had again changed hands in 1924 and passed under the control of steel millionaire Charles Schwab, rose to new heights with the Safety Stutz Vertical Eight, the Blackhawk and the fabulous DV-32, plus a romantic revival of the famous Bearcat, sold as the first American car with a guaranteed speed of 100 mph. The Blackhawk marked a period when Stutz *carrosserie* went Anglo-French in a big way. A light-weight British-inspired Weymann body, built from fabric on an ash frame, was married to the new chassis and given nostalgic French names like Versailles, Longchamps and Chaumont for the sedans, and Monte Carlo for the coupe, comprising what was called the "Chateau Line.'" The work was done by imported European craftsmen who pandered to snob appeal by producing duplicates of bodies on cars owned by the Prince of Wales, Duke of York, Lord Louis Mountbatten and "other foreign nobility." The Monte Carlo coupe was a replica of the body that won the International Concours D'Elegance in Monte Carlo, and was a rampant dream of coach-craft finesse. Adjustable "anatomical" seats were trimmed with Italian goatskin, while the door and windshield friezes were carved from artistically figured walnut. Front seat backs formed pockets of veneered woodwork and a radio was, of course, included. Factory list prices began at $3945, with the buyer covered by an unique Lloyd's insurance policy which protected him for a year against theft and for 30 days against the "inconvenience of not having his car." In that case he could claim up to $5.00 a day reimbursement in cab fares. All to no avail, for by 1935 the firm was bankrupt and out of business.

Harry Stutz, meantime, had remarried and moved to Orlando, Florida, there to devote himself to a citrus farm, yachting and plans for the design of an airplane engine. Taken ill in June, 1930, during a trip to Indianapolis, he died of a ruptured appendix at the age of only 54, short-changed by Fate of at least another decade in which his restlessness and brilliant imagination, enriched by vast experience, might have contributed further to the betterment of human travel.

The last Stutz ever to run at Indianapolis finished 10th in 1930. For the Car That Made Good in a Day, the wheel had turned full circle. —*JB*



"I don't know . . . turning the engine over on its side was okay, but . . ."

(*Continued from page 75*)

Ireland, asking for a body to fit his own Jaguar-engined frame which boasted i.f.s. and de Dion as well.

One thing led to another and a trade was worked out which brought the Irishman a Chevrolet engine, transmission, plus other oddments and eventually Bill went over to refine the car so it could be marketed in the U.S. with the Irish chassis, this latter being considerably cheaper to make on its home grounds with Girling discs (Triumph on the back) all around, Morris Minor steering, Dunlop wire wheels, and other limeyland components. The development of this car has gone forward, of course, but apparently production problems in doing over certain work have caused him to think seriously about making the whole shebang right in El Monte, where the plant is located now. "In the center of scenic Oklahoma," as Bill says, looking at the dust devils racing down the street.

As I think I have mentioned before, Bill is an enthusiast and proves it by continuing in the unprofitable world of specials when he has proved that he can make money in more normal lines of business. It seems to me that the only thing that keeps him from covering the country with his automobiles is that strange anomaly which has afflicted small manufacturers since the year dot: he lacks enough big money to hire more skilled people (although the staff he has is very good).

Bill himself, besides being his own best salesman (he now handles all business direct), advertising man, purchasing agent, designer, and pepper-tree engineer, is a tremendously interesting fellow and bags of fun to be with, especially when he is working on one or another of his special projects. At this writing Devin is modifying/constructing/inventing a special for the Roosevelt organization based on one of the very fast twin-cam Fiat-Abarth Zagato coupes, a very nice little wagon as is but one that can be improved. A fiberglass body has been made, the radiator has been put up front to eliminate the speed-robbing "pop chute" on the rear deck and overheating at one fell swoop, disc brakes are being applied as a distinct improvement over the original Mouse *freni*, and the engine is being stuffed up its own rear end, so to speak, in an effort to get its weight within the wheelbase.

He wanders about the fallout area, measuring this, calculating that, often applying his not inconsiderable practical knowledge of the shortest way to do something as he gets down to the welding and hammering himself. The whole time a continual flow of aphorisms, complaints, truths, half-truths, and witticisms, some of them printable, pours forth; most of it is intended to be something like Muzak and is disregarded by all except to fall on the floor laughing but the constructive suggestions embedded therein are generally valuable, even in the cracker-barrelese which Bill affects even though he is something less than countrified. Crazy like a fox, in fact. All in all, one could say that not only are he and his products a distinct addition to the sports car scene but there hardly ain't enough like him. The enjoyable part is wondering what he is going to come up with next. —*HM*

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UPCOMING LOWLANDER

Continued from page 38

94.82 mph set during the same meeting.

Recalling this Silver City dice, Jim says, "I was just trying to take a few lessons from Jack, rather than making to pass him — not that I could have done anyway, the chances are. Also, of course, I was hoping to harry him." It remains debatable whether, by practically riding pillion on the tail of the car in front, he was courting danger for both parties concerned (his Riverside experience supports the opposite view); but it's interesting to hear how he justifies it on purely tactical grounds.

First, he says it helps him to concentrate, which is something he doesn't otherwise find easy, once a race is well underway. Second, assuming the man in front is leading the whole field (which automatically puts him in the Moss-Brabham-Ireland-Hill class), he, the leader, will likely take the same line on every corner, every lap. This, says Clark, enables him to study the effect of ringing changes on *his* lines. Gain or lose a foot or two, each shift has its lesson to teach. This process obviously would be impossible at remoter range.

As a generality, the statistics of racing success and failure are often awful liars, and the axiom is one that Clark considers specially applicable to his own recent fortunes. By his own lights he didn't deserve some of the kudos he got last year, and really rated some he didn't get. The point can be illustrated in the context of the World Championship, in which he contested six events with the following results:

Netherlands G.P.: Repeatedly traded places with Graham Hill's B.R.M. — Hill finally finished third — then fell out with gearbox trouble. *Belgian G.P.:* Placed fifth in a race of tragedy that cost the lives of Chris Bristow and Team Lotus driver Alan Stacey, after Moss had nonstarted following practice injuries. *French G.P.:* Fifth again, despite sundry excitements that included finding neutral, and jamming in it, instead of the fourth cog he was fishing for on the flatout run-in to Thillois. *British G.P.:* In third spot at 20 laps, behind Brabham and Ireland, then his front suspension let go; finished last, with right-side front wheel nuzzling body (the car's, not his). *Portuguese G.P.:* Crashed during practice . . . car hurriedly rebuilt . . . took it easy in the race and placed third, behind Brabham and McLaren. *G.P. of the U.S.A.:* Classified 16th and last after his shunt with Surtees.

So out of six starts in *Grandes Epreuves*, the Clark score was third once, fifth twice, three DNFs, one limping finish. His personal view is that, given the breaks he didn't get at Zandvoort and Silverstone, he'd likely have finished in the place money there, but ought to have done better in Belgium. If you want a second opinion, though, his Spa performance wasn't anything to be ashamed of. As chance would have it, he arrived on the scene of the Bristow wreck just as they were gathering up poor Chris's remains, and Clark, although physically tough, isn't short on sensitivity. Thereafter, he recalls, his progress was so slow that Alan Stacey, who hadn't seen the evidence of the Bristow tragedy, reined in alongside Jim and dumbshowed an offer of a slipstreaming tow. Later, when he heard that Stacey too had got it, he was stunned.

Clark started his 1961 season with a victory at Pau where he won the first G.P. under the new 1.5-liter Formula. His opposition, headed by World Champion Jack Brabham, was strong yet Jim took an immediate lead in his Lotus with Brabham, in a Cooper, right behind him. No duel between them followed when Brabham was put out of the running with a broken fuel pump. Clark kept the lead, trailed by Jo Bonnier in an ailing Lotus with Clark's own car sounding a bit unhealthy at anything over 7000 rpm.

There's a significance that may not be selfevident in the fact that Clark, unlike any of the seven *pilotes* who placed above him in the 1960 World Championship, was not a C.S.I.-graded driver (though he is now, of course). Graded men are ineligible for Formula Junior racing. Clark, it follows, *was* eligible for this class, and indeed partook of it in large doses. On the one hand, you could argue, the F.Jr. outlet afforded him bonus experience on machinery of a type that bore anyway a tenuous resemblance to F.2 and F.1 cars. In reality, though, the affinity was *so* tenuous — contrast would be the apter word — that the result was a handicap rather than an advantage. In the case of Lotus the difference wasn't confined to the expectedly abysmal gap in power and torque but also included braking characteristics. The F.Jr. brakes were far lighter than the F.1 and F.2 counterparts, a discrepancy that, to take a case at random, put Jim hopelessly on the wrong foot at Brands Hatch last August. First he motored the Cheshunt mediumweight in the F.2 Kentish Hundred, winning from Dan Gurney (Lotus) by 2/5 second in a drive of absolute brilliance. Then he switched to the Ford-powered Junior and found himself almost floundering in the opening spell. On this one, a fairylike dab on the pedal was equivalent to a hairy lunge with the F.2 car. Trevor Taylor, Jim's frequent rival for F.Jr. honors during 1960, who didn't have the same self-adjustment to make, beat Clark to win this engagement.

More often, however, the boot was on the other foot. Daybooing in Junior racing at Christmas, 1959, with a solitary drive for Gemini at Brands Hatch ("The sight of those open wheels frightened me"), he articled himself to Team Lotus on F. Jr.-only terms a couple of months later. From then on he showed killer form on Chapman's Ford-engined grasshoppers, seldom losing an F.Jr. race that he finished and making a habit of fastest laps that usually were class records as well. Fortuitously, his first F.Jr. drive for Lotus — at Goodwood's seasonal opener in March, 1960 — earned him headlines that really were out of proportion to the occasion's importance. This was just a "club" affair, but because John Surtees, motorcycle World Champion many times recurring, was to make it his springboard into car racing, the popular press in Britain blew it up into some sort of Waterloo on wheels, albeit to John's own annoyance and embarassment. By the time you'd read the buildups the newspapers gave him, it was practically impossible to believe he and his Cooper-Austin wouldn't blow the competition clear off the track. Well, they did too, with the sole exception of Jim Clark, who beat Surtees by three seconds over ten frenetic laps, setting the fastest lap at 90.38 mph. With characteristic objectivity and fair-mindedness, Clark allows that Surtees likely would have won if he hadn't tried to put his car into gaps that were only a motorcycle wide, an understandable goof in view of his background.

Neither he nor Jim, to digress from our F.Jr. theme, were strangers to Goodwood when this duel came off, both having had tryouts there on the G.P. Aston Martin with a view to enlistment on the factory team. Surtees, you'll remember, opted out of the proffered contract. Later, in May, the Feltham firm bespoke Clark to drive one of their modified 1960 G.P. cars in the BRDC's Silverstone International but changed their minds when it developed that only two of these machines, instead of the hoped-for three, would be ready in time. So they released him to Lotus for the main Silverstone event — whereupon Colin Chapman changed *his* mind and gave Surtees the car that had tentatively been intended for Jim. You are, we trust, still with us?

Now back to Formula Junior. By our reckoning, Clark contested twelve F.Jr. races during 1960, on circuits as assorted and challenging as Goodwood, Oulton Park, Aintree, Silverstone, Monaco, Solitude, Snetterton and Brands Hatch, won seven of them, was second twice; he also turned F.Jr. record laps for five of these courses and won Britain's two most coveted seasonal championships for Juniors. That, to us, looks a satisfying score, but retrospectively it doesn't entirely satisfy him. For instance, he says he never got the hang of Goodwood on the F.Jr. Lotus, his tendency being to hang the tail out unprofitably far and often. If he'd kept it in a bit, no doubt he'd have improved on two wins, one second, one record lap, one fastest lap in three Goodwood races.

Nobody qualified to opine will contradict us if we say that Jim Clark has a real feeling for beautiful machinery. He abhors excessive rpm and would rather throw a race away than trespass beyond prescribed rev frontiers. "It never pays, anyway. If I find my lap times are too slow I'll always reanalyze braking points rather than push the revs up." Although disavowing scientific leanings, *vide* our opening quote, he is avidly absorbent of technical lore and proclaims an indebtedness to Colin Chapman for enlarging his engineering knowledge. During last year's fast-moving development of the 61-cubic-inch Ford engine fitted to the F.Jr. Lotus, serial changes were rung on cam form, and whenever a new knocker was adopted, Jim would be quick with questions regarding its effect on torque and power contours, and equally quick to adjust his gearshifting to the altered characteristics.

In the usual pattern that these things take, it was as a handler of sports and G.T. cars that Clark traveled the stony

road to his present relative eminence, starting in Scottish club races and rallies in 1956 with a DKW and a Sunbeam, his own property. He still has, indeed, a marked fondness for sports and G.T. competition, and some observers consider his Le Mans drive last year was among his best 1960 performances. He and Roy Salvadori, you'll remember, placed third overall, sharing an ex-"works" DBR1 Aston Martin entered by the Border Reivers team, of which more anon. In doing so, of course, they drove a wedge between six Ferraris that otherwise dominated the general classification.

This isn't the place to rewrite the story of Le Mans, 1960, but it's beyond argument that the Reivers entry owed its success more to Clark's efforts than to Salvadori's. But that, to be fair to Roy, was largely because Jim, the younger man by many years, was able to see — a little, anyway — under darkness-*cum*-deluge conditions that reduced his partner to virtual blindness. At one stage, just as darkness was falling, and with the rain coming down in buckets, Clark was knifing six seconds per lap off the Gendebien/Frere Ferrari's lead, and worked his way into second place. Even with his exceptional eyesight, Jim recalls that during the worst of the downpour he could see nothing, except by bracing his feet against the footrests that Border Reivers had provided and thereby hoisting his eye level above the top of the statutory high windscreen. At that, the attitude involved an excruciating crick in the neck, while to detract even further from the humor of the situation, the car, below decks, was as leaky as a colander.

"On the passenger side the floor was maybe a couple of inches deep in water. Under acceleration it would all woosh backwards, then forwards again when you lifted your foot. But the real fun began when you built up a respectable speed on the straights. Then, a blast of air through a gap of some sort on the bulkhead would pick the water up bodily, quarts of it, and dash it into your face, up inside your visor."

Respectable speed, in this context, was a relative term. What makes the Aston's third placement the more remarkable is that the car was, in Clark's idiom, "bog slow" — a clear 15 mph down on its pre-proven capability. During practice he was availing himself of a slipstreaming tow from the 2-liter Lotus Elite, and gaining 300 rpm in the process.

Although Jim derives no masochistic joy from racing in the rain, a wet track suits him in the sense that it's apt to reduce his lap speeds less than most people's. He finds a certain stimulation in low-traction conditions, and often voluntarily lights out in a hack car across the sheeplands around Duns when they're wearing their winter coat of ice, not with the intention of going any place in particular but just for the fun of it.

The DBR1 perhaps was never quite Clark's cup of tea, as the English simile hath it, and at presstime he'd yet to win a race with it. To redress an inherent lack of balance, he says, it needs sixteen imperial gallons of fuel on board, and except on a circuit like the Nürburgring, which suits its idiosyncrasies, the combination of "so much

(*Continued on page 84*)

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ROAD RESEARCH REPORT: LANCIA FLAVIA

Continued from page 46

at some future date.

The combined crankcase and cylinder block is split on its vertical center line like the transmission casing. A great deal of thought has been put into these components, and they are produced as aluminum die-castings with open sides so that loose segments in the internal dies are avoided throughout. The sump, with its cooling fins, is integral with each crankcase half, access to the oil pump and its pick-up filter being through a separate inspection cover. The halves are held together by set bolts on either side of each main bearing; Helicoil inserts are used in the female thread. There is, in addition, a series of bolts around the periphery of the joint face.

The wet cylinder liners are held in compression. The amount of clamping is controlled solely by the depth of the recess in the casing and the distance between the two flanges on the liner; in other words, no shims are used. A rubber ring, fitting into the chamber of the lower seating flange, forms the water seal. Between cylinder head, liner and crankcase there is a copper-asbestos gasket with a machined concentric V-section groove in the liner top face and around the combustion chamber in the cylinder head. A single water pump, with split outlet to each cylinder bank, is belt-driven from the crank in a four-point drive which includes the generator (hinged for adjustment) and a separate aluminum cooling fan.

INDUCTION AND DRIVE

Carburetion is by either a downdraft twin-throat Solex or Weber. The two throats lead into a common water-jacketed hot spot, from which individual pipes merge into separate intake ports on each cylinder head.

From the Fichtel and Sachs clutch, which incorporates a patented Lancia rubber-cushion disc, the drive is taken through the hollow hypoid pinion shaft to the rear of the main gearbox shaft. This allows a silent direct-drive top gear, as on the Corvair. All gears are in constant mesh with helical teeth, except for reverse; this is a separate train of straight spur gears placed between first and second. All forward ratios have synchromesh of blocker-ring type; selection is by a column-mounted lever through a complex but effective linkage.

What are the benefits of this elaborate engineering, so completely discussed by Mr. Mundy? Are all these features merely done for their own sake, to be in style or to create sales features? Our conclusion must be: not at all! The complex, imaginative design of the Flavia contributes specifically to product excellence and driver satisfaction.

LIGHTNESS YIELDS SILENCE

To begin with, Fessia's liberal use of aluminum and employment of integral construction reduces weight. This takes effect in two phases: overall weight and front-end weight. Let's look at overall weight first. When the Flavia was announced its curb weight was listed as 2689 pounds, properly judged by most observers as heavy for this class of car. With a full tank of gas, however, our leather-upholstered Flavia weighed in at only 2540 pounds — a pleasant, unusual surprise! Even more important, basic lightness has allowed Lancia to stay within this figure while applying lavish layers of soundproofing materials throughout the car, to reach its present silent state. For example, all the sheet metal surfaces under the hood are sprayed with a thick sound-deadening coating that's then painted. Under-floor matting is unusually generous.

The silence of this car is, as all of our Road Researchers commented, downright eerie. At around-town speeds the only sound from the engine is a breeze-like whisper, probably from the fan, and at cruising rates on the highway this is backed by a muffled hum that might be blamed on the camshaft drive. Other cars offer this kind of silence, but in addition the Flavia is virtually immune from wind noise. If all windows are shut (easy with the efficient ventilation system) and no crosswinds are blowing outside, you hear absolutely no wind! It's uncanny, especially in view of the squarish body shape. Finally the Flavia scores over most American cars — otherwise the world's standard of silence excepting Rolls — with its negligible road noise and utterly rattle-free body. Naturally, you feel it when the suspension moves and hear a distant rumble when the Michelin X tires traverse a rough surface, but otherwise, where sound is concerned, you might as well be riding in a vacuum, like Gagarin.

ROOMY, REFRESHING INTERIOR

Construction of the body yields other dividends as well. Though its overall dimensions are modest, its interior is expanded to maximum possible size by the smooth, flat sides of the body and the near-flush placement of the side windows, which are curved ever so subtly to provide even more elbow room. At a glance the Flavia looks like a high-built car, but as you become more familiar with it (and find that its height is practically identical with such competition as Mercedes and Peugeot) you realize that the illusion of height results from a fender line that's unusually low, thanks to the squat engine, leaving room for windows that are refreshingly high. This gives a wonderfully airy, clean-feeling interior and excellent visibility all around.

The second phase of the Lancia lightening campaign took effect over the front wheels. In a car of this engine size or larger, space within the wheelbase is best utilized by placing the engine out ahead of the front wheels — just as the powerplant is usually aft of the rear wheels in a rear-engined sedan. This biases the weight toward the front, which is necessary to get good traction but if overdone can result in unpleasantly heavy steering. In its search for silence Lancia couldn't accept the noise level of an air-cooled engine, which might offer lightness, so water cooling had to be used. Moreover the heavy water-filled radiator was placed out ahead of the engine, to prevent carburetor icing, instead of behind the engine as in many other front-driven cars. In spite of all these measures the front wheels carry no more than 60 percent of the curb weight, a mean rather than an extreme for front-driven cars. To achieve this the dry engine weight was held to 258 pounds, an impressively low figure.

SUPERB STEERING

Even more impressive is the effect of this lightness, and of the expensive half-shaft design, on the Flavia's steering. When parking it's admittedly heavy, but no worse than other front-engined sedans in this class and better than many. The instant the car moves away the steering lightens substantially to become as smooth and easy as anything on the road. Through its entire lock-to-lock range, with power on or off, there's not a sign of front-wheel-drive syndrome: the vibration in the steering wheel that confirms the front wheels are both steering and driving.

Steering lock is always a problem with front drive, especially with a wide, opposed engine tending to get in the way. This is aggravated by the need to leave room to fit chains to the front wheels in winter. Rather than sacrifice the all-year turning circle to the needs of winter, Lancia chose to install an auxiliary steering movement limit stop on the linkage idler arm. The normal range of 5.0 turns lock-to-lock is limited to 4.2 turns with the limit stop engaged, and the turning circle is increased 6 or 7 feet accordingly. Lancia attention to detail was never better illustrated.

STABLE HANDLING

Though it's not a sports car, and not intended to be, the Flavia's handling is stable and responsive. When you swing it into a corner it takes a four-square stance and shifts willingly into the new line, the rear end obediently trailing the front. The higher roll stiffness of the rear suspension effectively counterbalances the extra weight at the front, giving the Flavia remarkably mild understeer as the Steering Behavior graph shows. At very high cornering speeds the inside rear wheel lifts (as on many front-drivers) and understeer increases, bringing both ends of the car near break-away simultaneously. No violent reaction results if you back off on the throttle during such maneuvers; in fact we've experienced far more dangerous "whiplash oversteer" on rear-drive sedans in this situation.

Cornering is accomplished, like everything else, in silence in the Flavia, by virtue of Michelin X (on our car) or Pirelli Cinturato tires. Good handling is designed in as an enhancement of safety, for the Flavia in its native land is not even intended to be a sports sedan, but rather a smooth, sound tourer for upper-middle Milanese — and now for Americans of the same class. This is symbolized by the bench seats front and rear, without even pull-down arm rests to simulate buckets. Foam rubber cushioning by Pirelli is comfortable and has the controlled firmness that's not designed for showroom selling but markedly reduces fatigue on long trips. A central lever controls a long fore-aft adjustment and a Reutter mechanism allows multiple back inclinations, all the way down to a flat bed position. The optional leather upholstery on C/D's Flavia was a pleasure to the eye and fingertip.

DRIVER IN CONTROL

The late K. T. Keller of Chrysler would have been delighted with the genuine chair-height seating position of the Flavia, and with doors that open extremely wide

and are high enough "so a man can get in with his hat on." It's a pleasant position that really puts the driver in control. The rather small black steering wheel is very well placed at a comfortable angle, and has a fine-ribbed surface finish that's not annoying. Though they're pendant-type, the clutch and brake pedals are completely natural to use, and the organ-type accelerator pedal is familiar. They're perfectly related, so the driver can leave his right heel on the floorboard while swinging his toe from throttle to brake in the most relaxed manner.

Door fittings include a transparent plastic hand pull that's a little incongruous with the rest of the interior, a recessed safety latch that's easy to use, a conventional window winder and a vernier knob for the slim quarter-pane that provides positive placement of the vent but can be interminable to operate. The comprehensive nature of the dash and controls can best be gathered from the photo and drawing on the data pages. The water temperature and oil pressure gauges lack any numerical values, though, and the night lighting isn't able to achieve very high brightness levels. Against this, the horizontal ribbon-type speedometer actually does work horizontally, and is one of the best of its breed we've seen. At night the ribbon glows a bright, warning red.

A small lipped shelf atop the switch console is handy for toll change, and is augmented by a roomy lockable glove compartment and other pockets in both front and rear. The front ashtray is a novel conversation piece. To open it you squeeze its two "handles" together. The left one releases the tray, which pops out; the right one presses in a small cigarette lighter element that's dimensioned so cigars are out of the question and, in consequence, heats up very quickly and pops out again. Below the ashtray are the two knobs that control the modestly-powered heater with ease and precision.

SMOOTH RIDE AND PERFORMANCE

The ride of the Flavia is as refined as its interior. It handles every kind of road surface without pitching or bounding, simply maintaining a level path while the wheels bounce and are firmly damped on the rebound. Some of this action is transmitted to the body, of course, giving a useful but never annoying feel of the road. Put briefly, the Flavia rides as we feel a car should ride: comfortably stable.

Readers who think of flat-four engines in terms of VWs and Porsches will be amazed by the silky, silent operation of the Flavia's powerplant. With a push on the ignition key it starts instantly from cold, and on a chilly morning the choke needs to be held out an unusually long time before smooth performance can be obtained without it (Solex-carbureted car). It idles unobtrusively and responds quickly to the accelerator.

Since a heavy additional spring has to be overcome to open the second carburetor throat and unlock all the engine's power, this progressive carb arrangement has a large influence on the character of the Flavia. On the highway one tends to drive it to the limit of the primary throat, which delivers a cruising speed of about 55 mph on the level and excellent gas mileage (Regular grade) of better than 30 mpg. It will readily cruise faster with the secondary open and will accelerate snappily through the gears, but this can bring mileage nearer 20 mpg, especially in town.

SHIFTING AND STOPPING

American drivers may find the Flavia a disappointing performer in top gear, on steeper highway grades, but the all-synchro gearbox is there to be used. Even so, its third-top gear step is a wide one, third gear being rendered useful only by the engine's willingness to rev high. The shift pattern is clean and compact, actuating a synchromesh that's more powerful on the top three ratios than it is on low gear. Requiring rather heavy pressure through its simple mechanical linkage, the clutch is smooth in operation.

You don't often want to bring the Flavia to rest, but when you do it's a pleasure. The brakes are superb. The mating of a servo and disc brakes, not always happily accomplished, is completely compatible here. You need only a toe's touch for most normal applications – yet the pedal is firm and consistent, never flinging you forward in surprise. In size and operation the brakes are powerful beyond any ordinary requirements.

The elaborate copper piping of the brake servo system is just one of the technical delights that abound under the Flavia's hood. Along the left side of the compartment all the electrical elements – fuses, wiring, relays, regulators – are arrayed in one integrated panel for easy access. On the right side is a two-position lever that controls a set of shutters in front of the top three-quarters of the radiator core. (Even with these closed, the Flavia was reluctant to get up to temperature on a cool day.) Taking a minimum of space are the piping and three elements of the wonderful, road-clearing trumpet-type horn. Dipsticks for both engine and gearbox are easily reached, and most service appears easy except checking the valve clearance, which requires removal of a panel in the front wheel well.

THOUGHTFUL DETAILING

At the rear, the trunk has a push-button latch that retracts itself flush when locked to discourage tamperers. Though the lid hinges high, the spring counterbalancing strut on this particular car was too weak to hold it against the lightest breeze. The flat-floored trunk is very roomy, with the spare placed vertically at the right. Behind it are the neatly boxed tool kit and the scissors-type screw jack, which fits specific jacking notches under the body sills. A ratchet wrench is supplied which fits both the jack and the wheel nuts, which are brass (four per wheel) to prevent rusting. Even the three hubcap retaining springs are rubber-tipped to eliminate a possible source of noise!

Looking back at the Flavia, we all agreed that it has one glaring fault: the rear-view mirror is too small. It doesn't take advantage of the wide rear window. Trivial? Certainly, but that's the kind of carping we were reduced to by this craftsmanlike car. You don't judge the Flavia in terms of dollars per pound or cubic inch; much like a Porsche, though in a different area, you judge it in terms of pleasure and performance for your money. Is it worth it? We can only say that the fascinating Flavia gave us some of our most genuinely enjoyable moments behind the wheel. *—C/D*

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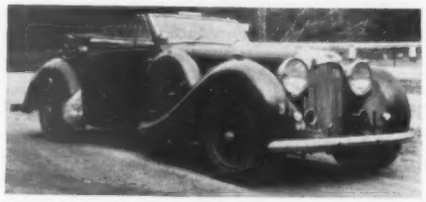

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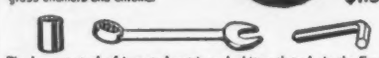

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(*Continued from page 79*)

power with so little handling" can be disconcerting.

Prolific race winner that he presently is, Clark's heyday in terms of purely statistical success lies behind him, and also, it could be, ahead of him, of course. In the first of the two seasons he raced exclusively for Border Reivers, 1958 and '59, he copped the remarkable total of twenty wins and eight other prize-winning places in thirty-three starts, driving a D-Jaguar and an Elite. The following year, with the Elite and a Lister-Jag, successor to the D-Type, he scooped no less than twenty-three wins and five speed championships ranging in value from the local to the national. Results like these, admittedly won in the face of weaker opposition than he's since become accustomed to, were the fruits of, firstly, Clark's own born skill and the fighting ardor that's legendarily native to the Scots (*perfervidum ingenium Scotorum*, no?), and secondly the vigor and efficiency of the Border Reivers stable, a consortium of Berwickshire farmers and garage owners whose services to Scottish motor sport have been second only to those of Ecurie Ecosse. This outfit, managed by Jim's closest friend, Ian Scott-Watson, himself a Lowland farmer, was and is animated solely by patriotic motives. Borders Reivers, geared to sports car and G.T. racing only, which isn't even potentially a profitable field, has consistently put more into the game than it took out. Clark himself, during the two seasons his services were ten-tenths at B.R.'s disposal, neither asked for nor received any payment for them, and throughout '58 he even paid his campaigning hotel bills.

A smooth-complexioned, boyish-looking type, whose age you'd probably guess at less than his twenty-five years, Clark is deceptively tough fibered. When he ran out of road at Oulton Park, following his entanglement with Brian Naylor in the Gold Cup, his Lotus smacked and surmounted a demolition-proof barrier guarding the outfield. Jim sustained multiple bruises and a hell of a shaking, enough to deter most people from further racing that day. But he not only raced in the ensuing F.Jr. feature but won both of its heats against fighting-fit competition. Then at Brands Hatch last Christmas, when he won the final round of this track's seasonal F.Jr. championship, it wasn't publicly known that he was in a much detuned state as a result of a cholera inoculation in readiness for takeoff for New Zealand.

One evening in London last winter, while we were chomping chop suey in the company of Team Lotus drivers Innes Ireland and Jim Clark, the former mentioned that a Sunday newspaper with a circulation of millions had just invited him to write a 2000-word answer to the question, *"Why* do you race"? This was a prospect that didn't in the least daunt the articulate and uninhibited Innes, who proceeded to give us a short verbal digest of his article. We tried the same question over on Clark, who's never written anything in his life and entirely lacks Ireland's sophistication and bent for selfanalysis. He made a few dummy starts at an answer, finally abandoned the thing in mid-sentence. He races, we'd say, because he likes it—just about as much as he likes raising sheep. Which is a lot. —*DM*

July 1961
Car and Driver
INDEX OF ADVERTISERS

Advertiser:	Page No.
American Carry-Products, Inc.	71
Arnolt Corporation	12
Autolite	5
Bakers Worldwide Auto Parts, Inc.	6
Barker Motors, Inc.	74
Bentley, Inc., Robert	1
Biener Pontiac	84
Buick Motor Division, General Motors Corp.	3rd Cover
Charmant Imports	74
Clymer Publications	70
Engineering Research & Development Associates	76
Fiat	3
Firestone Tire & Rubber Company	13
Fisher Products	9, 20
Genser-Forman, Inc.	77
Gray's	79
Haan, Inc., Vilem B.	11
Hambro Automotive Corp.	2nd Cover
Heath Company	75
Import Car Registry	74
International Automotive Imports	18
Iskenderian, Ed	70
Jaguar Cars, Inc.	4th Cover
Jahn's Quality Pistons	76
James Auto Specialties	75
Judson Research & Mfg. Co.	7
Kendall Refining Co.	8
Leitz, Inc., E.	19
Lev-Lite Electronics	75
McKeown Flexible Coatings	74
Marken, Ltd.	16
Mitten, M. G.	15
Motor Sports	71
Oldsmobile Division, General Motors Corp.	51
Overseas Motors Corp.	79
Peregrine Cars, Ltd.	68
Peugeot, Inc.	33
Pierlot, Louis B.	71
Plexicraft	76
Polk's Hobbies	69
Ramcote Products	12
Rathmann Racing Products, Inc., Jim	14
Robbins Auto Top Co.	14
Ronco Corp.	18
Rosemont Productions	16
Southwest Imported Auto Parts	72
Sports Car Manuals Co.	84
Sprinzel, Ltd., John	76
Stebro Motors	17
Stewart-Warner Corp.	71
Sullivan Speedometer Service, Paul	84
Tec Auto	79
Volkswagen of America, Inc.	34
White & Bagley Co., The	4
Wilco	84

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*Bucket seats optional at extra cost.

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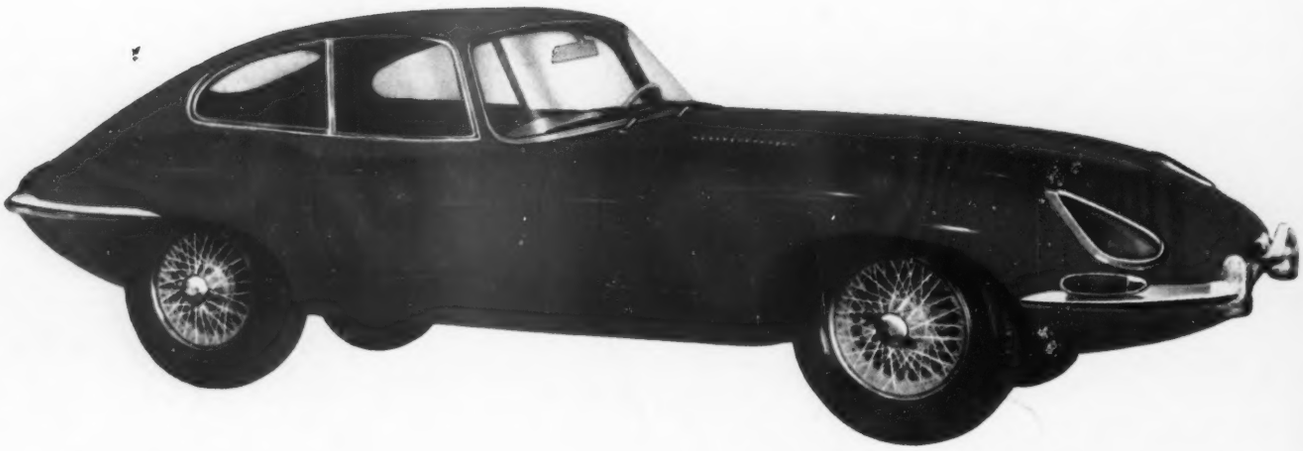

This is the new Jaguar XK-E!

Jaguar Cars Inc., 32 East 57th Street, New York 22, N. Y.